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INTERNATIONAL CLINICS:

A QUARTERLY OF CLINICAL LECTURES

ON

MEDICINE, NEUROLOGY, SURGERY, GYNÆCOLOGY,
OBSTETRICS, OPHTHALMOLOGY,
LARYNGOLOGY, PHARYNGOLOGY, RHINOLOGY,
OTOLOGY, AND DERMATOLOGY,

AND SPECIALLY PREPARED ARTICLES ON TREATMENT AND DRUGS.

BY PROFESSORS AND LECTURERS IN THE LEADING
MEDICAL COLLEGES OF THE UNITED STATES,
GERMANY, AUSTRIA, FRANCE, GREAT
BRITAIN, AND CANADA.

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Drugs and Remedial Agents.

COLD AS AN ANTIPYRETIC.

BY HORATIO C. WOOD, M.D., LL.D.,
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All temperatures above normal will do harm in direct proportion to the degree of elevation and the duration of the fever; slight excess of temperature will produce little if any inconvenience unless continued for a long time, whereas a great elevation of temperature cannot be endured for any length of time without producing serious injury, or even death; and this injury or death is the direct result of *heat.*

When an elevation of temperature is produced by a specific cause, as that of the *infectious fevers*, there is always the additional danger from the bacterial toxin besides the injury due to elevated temperature. Therefore, patients suffering from such diseases cannot endure as high a temperature for the same length of time as those who are suffering from *thermic fever*, or what is popularly known as "sunstroke." In the latter case the system has but the one depressing factor to fight. *But in both cases the temperature must be reduced.*

It matters not what the nature of the infection may be, or what may cause the rise of temperature; the indication remains always the same,—to get rid of the superfluous amount of heat.

To bring about this reduction of temperature, the most natural and efficient method is the application of cold in one way or another, but the application of cold should be in proportion to the amount of heat and stubbornness of the fever. If the fever is mild, the plan of treatment may be mild; if the temperature is very high, and yields with difficulty, it must be dealt with more vigorously for subjection.

In diseases where we have infection from bacteria there are always three conditions present which endanger life and which must be recognized by the physician,—(1) the bacterial toxin, (2) the fever or elevated temperature, and (3) the starvation or underfeeding.

In most diseases of bacterial origin the patient is to be treated, and not the disease, since the toxin is not under our control, and these diseases will run their regular courses. But the high temperature is a condition which is more under our control, and this evil should, as far as possible, be eradicated from the course of illness and the patient's chances of life to that degree increased. In a great many cases the additional strain of the high temperature may prove sufficient to so exhaust the patient as to lead to a fatal result, which might have been avoided by antipyretic treatment.

But even if it should not be a case of life or death, it is inexcusable for a physician to allow a patient to endure, through the course of the illness, the suffering which an elevated temperature causes. High temperature influences the general nutrition to such an extent that the patient cannot take a sufficient amount of food to maintain strength, besides causing physical suffering, loss of sleep, and restlessness. This lack of nourishment may make the difference of life or death.

Therefore the control of the temperature in fevers is of far reaching importance. Not only does it prevent direct harm to the tissues, especially to the nervous system, which is most susceptible to fever, but it indirectly aids the nutrition; under such conditions more food can be taken by the patient, which will augment his comfort, rest, and sleep; and all of these factors become of importance in resisting the other deleterious influences of the disease.

In the treatment of high bodily temperatures *cold* is superior in safety and efficiency to antipyretic drugs. When the temperature of fevers promises a course prolonged over many days, *cold* should always be preferred for the reason that it is always at hand in some form or another and has no depressant influence *so long as the body temperature is above normal*, whereas, although the antipyretic remedies will reduce temperature, their after-effects are always those of general depression. This depression may be at times so mild as to escape notice until repeated doses have been given, while in other cases, as in the late stages of low fever, a single dose some-

times produces depression which is alarming and has occasionally proved fatal.

METHODS OF USING COLD.

Cold Baths.—The so-called "Cold-water Bath" is used at a temperature of about 60° to 70° F. Occasionally, however, much more drastic measures become not only justifiable, but necessary. In such cases as sunstroke, where the temperature may be 110° or more, threatening speedy dissolution if not immediately relieved, the patient may even be immersed in a slush of chopped ice and water. In these cases the bodily temperature should be closely watched, for it may go on falling after the patient is taken out of the cold bath, and lead to a collapse as dangerous as the original disease. When the temperature has reached 102° the patient should be removed from the bath. When, in a case of sunstroke, the proper means for a cold bath are not at hand, those to be had must be used with as much vigor as possible; the patient should be placed in the shade and the head and trunk soused with water as cold as is obtainable, or the body rubbed with ice.

In the use of the cold bath care must be taken to keep the head cool, preferably by means of an ice cap, and to maintain the peripheral circulation by friction while in the bath. Of cardiac stimulants, alcohol is especially useful on account of its dilating action on the blood-vessels. Much shock may be saved the system by placing the patient in the bath at 80° or 90° and gradually cooling the water after he is in.

In organic cardiac lesion the cooling of the surface of the body may embarrass the heart, partly through reflex nervous impulses, and partly by driving the blood from the surface into the deeper structures, thus increasing the resistance of the blood current. In many cases, however, the weakness of the heart is directly due to the high temperature, consequently in such cases the heart cannot be helped in a better way than by lowering the temperature at once, the cardiac muscle and cardiac innervation being seriously affected by an elevated temperature. Even if the heart be weak from organic disease, the use of the bath is not so greatly contra-indicated as an antipyretic; but the reduction of temperature by the bath must be brought about slowly and by such means as will not produce shock. A bath of 80° to 90° is safer in these cases, and will prove efficient in the majority of instances.

Tepid Baths.—The bath which is usually employed in the treatment of ordinary acute fevers, such as typhoid, typhus, influenza, pneumonia, etc., is the *tepid bath* as usually given from 75° to 85° F. The patient is wrapped in a sheet, immersed in the bath, and allowed to remain for from fifteen to twenty minutes, or until the temperature has fallen to 100°, then removed from the bath and put to bed with light covering over him.

As a rule, it is best to bathe patients suffering with specific fevers whenever their temperature reaches 102½° to 103°. The frequency of the baths must be regulated by their effect on the temperature; in some cases it is necessary to bathe the patient four or more times a day, while in other cases two baths in the same length of time will be sufficient; in no case is it probably well to bathe oftener than eight times in the twenty-four hours.

Sponge Baths.—The sponge-bath, though often much more convenient than the tub-bath, is not so prompt nor efficient in its action. It is usually applied by first stripping the patient and then sponging the different parts of the body in succession with cold water continuously until the temperature is reduced. The fall of temperature is effected more slowly, and in many cases it becomes necessary to keep up the sponging almost continuously. The sponging may be made very much more effective by fanning, or by adding alcohol to the water, so as to produce a more rapid evaporation of water from the skin.

When very cold water is so unpleasant to the patient that it is apt to make him rebellious, it does not reduce the temperature so rapidly as luke-warm water with fanning. This is explained by the reflex contraction of the vessels of the skin due to the cold, which will not permit of as much radiation, so that the heat is retained in the body while the skin resists the cold. The skin remains relaxed in the employment of luke-warm water, allowing liberal heat radiation.

Cold Pack.—The cold pack is applied by wringing a sheet out in ice-water and wrapping it around the patient. This is a less efficient and more unpleasant method than the cold sponge. In applying the cold pack it must be remembered that if no means is provided for keeping it cool, the water in the sheet soon reaches the temperature of the body and we have a hot rather than a cold pack. In most cases, if the wet sheet is allowed free exposure to the air,

the evaporation of the water is sufficient to keep down the temperature of the pack; if not, by placing the patient in a draught evaporation may be quickened. It is, therefore, readily evident that to cover a patient in a cold pack is to stultify the whole treatment. For the same reasons, sheets and not blankets should always be used.

Air Baths.—Sometimes, especially when cold baths are not to be had, cold air becomes of great value for the reduction of temperature. This method, at least in winter time, is of very simple application: the patient is covered with nothing but a thin sheet, and the windows widely opened until the temperature of the room has fallen sufficiently low for the needs of the occasion. The cold-air treatment may be boldly employed, for patients with high temperatures cannot take cold; that is, until their temperatures have fallen to near the normal.

Attention may be called in this connection to the temperature of the room. To keep a fever case in a room with a temperature of 80° F. and piled up with blankets must of course seriously interfere with the elimination of heat, and may do almost as much harm as our cold bath will do good.

The great disadvantage of the cold-air treatment is that we cannot control it so well as the cold bath. After the patient's temperature has fallen the room is still cold, and the patient is in danger of suffering bad effects from undue exposure, since the fever has left him.

There are several important points which must be kept in view. In the first place, the severity of the antipyretic measure, or the amount of cold air you admit and the amount of exposure of your patient, is entirely determined by the height and stubbornness of the fever. Never should you allow more exposure than is necessary to reduce the temperature to a desired point. The thermometer must be the guide, and there should never be any more exposure than is required to do this work.

Secondly, the patient should not be exposed below the pelvis, and the legs and feet should be well protected. Should the feet show any disposition to become cold, no matter how high the general temperature may be, a local application of heat is indicated. In the latter, or weak stages of low fevers, when the patient is much emaciated, it is well to keep the arms and hands covered, especially if they show a disposition to become cold.

There are a great many people, both in and out of the profession, who still have some scruples about this exposure to cold air, for fear of the patient "taking cold." It takes but a second, however, to show that there is no such danger except through carelessness. *It is physiologically impossible that a cold can be taken when the body temperature is above normal;* so the taking of cold on the part of the patient can only be the outcome of negligence on the part of the nurse, by allowing the patient to remain unprotected after the temperature has become normal. At no time should the patient be exposed to cold draughts when asleep. In warm weather moisture may be used in conjunction with the air current. The proper way to do this is to expose the abdomen and chest of the patient and then keep them wet with luke-warm water in front of an open window with a good draught. Fanning may be an additional necessity when the fever is disposed to rise.

Cholera Infantum.—It has now become a recognized fact that the disease known as cholera infantum in children is often nothing more than a form of thermic fever, or heat exhaustion; and the treatment, therefore, is the application of cold to reduce the temperature.

If the child is seen during the period of elevated temperature before collapse occurs, the temperature should be promptly reduced. If, however, the case is not seen until collapse is present, and the body temperature has fallen below normal, the application of heat to the child and the internal use of stimulants must be resorted to.

The diarrhœa which accompanies the collapse is probably the outcome of vasomotor paralysis and a leakage of serum from the blood-vessels into the intestines, which accounts for the fact that the stools are like water or serum, without much mucus or fecal matter. It is also easily understood why cholera infantum should be so fatal after it has been allowed to go on to the stage of collapse in which the diarrhœa occurs, because by this time changes have not only taken place in the digestive tract, but also in the nervous system, which in many cases are irreparable and go on to fatal result.

The subject is of far more importance, however, if the prophylactic side of the question be considered, than the mere treatment of the condition after it occurs. The occurrence of cholera infantum, or *heat-stroke*, in an infant can be prevented as readily as sunstroke in an adult. Keep the child in a cool, shaded place, with plenty of

air and as little clothing as possible. If the weather be extremely warm, the child may be bathed twice a day in front of an open window, to keep the temperature normal. In this manner a child can be kept healthy throughout an entire summer.

It is curious enough, but true, that during three or four successive hot summer days the temperature of babies less than a year old is often found to be 102° to 103° F. and the children appear to be perfectly well, although they may be a little languid or at times fretful, but the mother never suspects anything is wrong. I have made a series of observations during the last four summers to determine this fact, by taking the temperature on hot days of as many infants as I could get access to, and it was to my surprise that I often found in apparently healthy babies a temperature of 102° to 103°.

Cases of cholera infantum are much more frequent after a period of four or five hot days than they are after one or two days of high temperature. The body temperature is commonly elevated through the entire period, but it is only after the fourth or fifth day of excessive heat that the imperfectly developed *heat-regulating centres* of the infant became paralyzed, the body temperature rapidly rises, and a heat-stroke or cholera infantum occurs. Infants and even children less than five years old, perspire very little, and in an infant less than a year old there is practically no perspiration except a very little about the face and neck. The secreting glands of the skin are not sufficiently developed to become functional, and infants are therefore deprived of this means of regulating body temperature.

In adults, perspiration and its evaporation are one of the great means of maintaining a normal temperature when exposed to great heat. The heat-producing centres and the heat-inhibitory centres in an infant are not developed, and consequently the thermic nervous system is not as capable of maintaining an even body temperature when the temperature of its environments is fluctuating either above or below the normal. Therefore we must aid nature by relieving the thermo-regulating system of the infant from all unnecessary strain.

WHAT CAN BE DONE FOR THE CURE OF INFECTIOUS DISEASES BY GENERAL THERAPEUTIC MEASURES?

PAPER READ IN THE BERLIN SOCIETY FOR INTERNAL MEDICINE.

BY PROFESSOR A. WASSERMAN,

Berlin, Germany.

The therapeutic nihilism which characterized the so-called Vienna school is now a thing of the past. We have passed through the anatomical era of Rokitansky and Virchow and an epoch of most important etiological research, and are now in a period in which therapeutics has come once more into the foreground, and in which it is more clearly recognized that the main aim of the physician is to cure disease. But the epoch of physiological discoveries has not gone by without influencing our way of thinking on questions of therapeutics. We have got to know specific causes, we have studied the alterations that the organs undergo, and the next step naturally was to find remedies. This tendency was inaugurated by the introduction of tuberculin, and celebrated its highest triumph in Behring's antidiphtheric serum. Chemical medicaments for special purposes and for special organs or parts of organs were now devised with clear consciousness of the end in view. Everywhere the adaptation of therapeutic means to special ends prevails. Specifics like antidiphtheric serum and quinine represent the ideal of therapeutics; the chemico-pharmacological remedies for diseases of special organs have been used with splendid success. Of specifics, however, I will not speak; I will rather discuss the question whether therapeutic measures are of use in the treatment of diseases for which we do not yet possess such remedies, and in the treatment of which our therapeutic procedure is still impotent and has no exact scientific basis. I speak of infectious diseases only. The opinion has arisen that the general therapeutic method formerly in vogue, especially the die-

tetic-hygienic method, has no scientifically justifiable effect on organisms attacked by germs of infectious disease. But this is not the case; on the contrary, experimental results speak for the influence of dietetic measures, for, as was first proved by Pasteur, animals can be made susceptible to infection by hunger, refrigeration, and other measures of a general nature. It is also certain that hydrotherapeutics and good nutrition have a favorable influence on the course of infectious diseases. This course is closely connected with immunity, which is marked by the presence of certain substances in the blood-serum. So far as cholera, diphtheria, and typhus are concerned, it has been proved that these immunity-conferring substances are prepared in the organism; they render the pathogenic germs and all poisons harmless, whereupon the patient recovers. Progress has been made in the knowledge of these specific substances; in tetanus, too, such immunity-conferring substances have been found. The presence of these curative substances depends on the functions of quite definite organs. In tetanus the source is the central nervous system; in cholera, as Marx and Pfeiffer have shown, the spleen, the glands, and the marrow; and I have discovered that in typhus the sources are the same. New functional demands, simultaneous with vigorous new growth, regeneration of the cells of the organs, are thus made on the spleen, the lymphatic gland system, and the marrow. A process of continual segmentation goes on in these cells, and a number of new elements originate, which produce the immunity-conferring substances which are then given off to the blood-serum. The clinically demonstrable expression of these powerful vital processes is the swelling of the spleen, especially in typhus. One need not hesitate to speak of an infectious splenic tumor, which is the clinical expression of the increased activity of the spleen. The system of organs which prepares the immunity-conferring substances has another important and more general function, the regeneration of the blood. This explains the anæmic symptoms that appear after many infections, which symptoms have hitherto been attributed to direct destruction of the blood-corpuscles. My investigations, however, show that this is not the case, but rather that, when the blood-regenerating system has the second task of forming the immunity-conferring substances laid upon it, these symptoms are produced mainly by the want of adequate regeneration of the blood, the energy of the hæmatogenic apparatus

being claimed during convalescence for another plastic purpose. Thus, when typhus runs a normal course, the organism initiates the specific cure of its own accord, the spleen and the lymphatic apparatus begin to swell under the influence of the typhus bacilli, and the curative substances which are given off to the blood originate. When this takes place in adequate quantity, convalescence begins, and an old Hippocratic dictum proves true. This process requires a definite time. All measures that support this creative process of the diseased organism, or contribute to help it over the period necessary for the completion of the said process, have a directly therapeutic effect. The first place among these belongs to correct and adequately guided nutrition, which gives the organism strength, and to judicious care, especially the most scrupulous cleanliness, with a view to preventing mixed infections. We shall also have to direct our attention to those general therapeutic measures which influence the regenerative action of the hæmatogenic or leucoplastic apparatus, especially the hydrotherapeutic methods which have already been tried empirically with success. Climatic influences (especially those of loftily situated places), massage, and hydropathy are important aids to convalescence; here a wide field, resting on a good experimental and scientific basis, opens up for these powerful therapeutic factors. Specific treatment will always remain the ideal in infectious diseases, for it saves the organism the natural curative process, which exposes it to incessant danger; on the other hand, the most recent experimental results coincide with the experience gained at the bedside of the sick.

Treatment.

THE TREATMENT OF CHRONIC BRONCHITIS BY MEANS OF THE IPECACUANHA SPRAY.

CLINICAL LECTURE DELIVERED AT THE ROYAL HOSPITAL FOR DISEASES OF THE CHEST.

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Gentlemen,—In the remarks I am about to make on the treatment of chronic bronchitis, I cannot claim to bring forward any novel form of procedure. The means employed are indeed numerous, and the therapeutic armamentarium is well furnished with weapons for the combating of this disease, and yet, as Whitla truly remarks in his "Dictionary of Treatment," "Unfortunately, we do not know the class of cases in which some methods fail and others succeed until we try, and occasionally the physician will find himself combining several in one prescription,—mitrailleuse-like." Still, in spite of this statement, a somewhat prolonged experience has convinced me that standing out above others in their influence for good are certain methods which have apparently fallen out of use, or if used are not so widely known as they should be.

Some years ago I came across a paper by Dr. S. Ringer and Dr. Murrell on "The Value of the Ipecacuanha Spray in Winter Cough and Bronchitic Asthma." Their results were so strikingly successful that I determined to test this method of treatment.

They stated that the merits of their system consisted in the fact that without any internal administration of drugs usually employed it tends rapidly to relieve the dyspnœa, to loosen the phlegm, and promote expectoration, and, above all, to cut short the case more quickly than the ordinary routine methods usually employed.

Their manner of employment consists in spraying, by means of

an ordinary hand-ball-spray apparatus or the steam atomizer of Siegle or Richardson, the ipecacuanha wine, either pure or diluted in the proportion of one part to three of water. The patient is directed to inhale as deeply as possible, at the same time closing his nose with his fingers. The amount sprayed at a single sitting consists of from one to four drachms. One hundred squeezes of the hand-ball are equivalent to one drachm of the spray used. The patient must also be directed not to swallow any of the spray which may accumulate in the mouth, but to spit it out.

I have now used this plan of treatment for some time, and am satisfied from my own experience that the claims of its authors are not exaggerated. I need not narrate all the cases I have thus treated; suffice it to mention one or two, which may be taken as types of others.

The first case was that of a lady who suffered from bronchitic asthma, the attacks of dyspnœa being worse at night. All the usual remedies were employed without much avail until the ipecacuanha wine spray was used. This gave rapid relief to the dyspnœa, and in a short time the patient was well.

William T., aged thirty-nine, suffered from winter cough for six years; complained of dyspnœa, which was worse at night and prevented him from lying down. He had considerable difficulty in expectorating, and had lost flesh. On examination, the chest was found to be barrel-shaped, with impaired movements, tympanitic note all over, and rhonchi of varying intensity and character. During the first month of admission into the hospital the ordinary ammonia and potassium iodide mixture was tried; as there was but little improvement, the ipecacuanha wine (one in three) spray was ordered to be administered once a day. The result was most satisfactory: the dyspnœa rapidly improved, the cough became less, while the expectoration was freer, and in six weeks the patient was discharged as being well.

Isabella W., aged thirty-five, suffered from winter cough for fifteen years. She complained of dyspnœa, distressing cough, and much expectoration, and she had great difficulty in getting to and from the hospital. Her aspect was livid, and on examination her chest presented in a marked degree the sign of chronic bronchitis and emphysema. As she refused to come into the hospital, I instructed her to come up and have her chest sprayed with ipecacuanha

wine. After the first inhalation she said that she was able to get here nicely, and that her breathing had become easier and the oppressive tightness of her chest relieved.

I have stated that the advantages of this treatment are that it at once tends markedly to relieve the dyspnœa, and so promote sleep and to shorten the duration of the case; all the patients spontaneously remarked that their breathing was easier and the oppressive tightness across the chest relieved, and that the deeper the inhaled spray seemed to penetrate into their lungs the more relief they obtained.

What are the disadvantages? In hospital practice it is, of course, an easy matter to carry out this treatment systematically, but it is not so in private practice. The amount of spray must be properly regulated, as in some cases it is at first not well borne, but causes vomiting and sometimes severe paroxysmal dyspnœa. The strength of the spray requires careful adjustment. Some patients fail to derive benefit from it because of their awkwardness in arching the tongue. Lastly, in true asthma the ipecacuanha tends to aggravate the disease.

I have also tried a spray of a one-per-cent. solution of potassium iodide. This also will relieve the dyspnœa, and is especially useful in cases of asthma and in persons of a gouty tendency. A patient of mine, suffering from dyspnœa of chronic bronchitis, compared the sensation after inhaling the iodide of potassium to that of taking a draught of fresh air into his chest. I may mention that iodide of potassium is the basis of a remedy advertised under the name of spirone, which is found to consist of this salt dissolved in acetone and glycerin.

Sprays of tartar emetic, antimonial wine, and lobelia are also said to be of use, but these I have not tried. Dr. Murrell recommends jaborandi, but it has the disadvantage of staining: he tells of an old gentleman who came to him with a snow-white beard and, after the inhalation, went away with a green one.

It will be seen from the above remarks that the class of cases in which the method advocated is suitable is that where, with a history of repeated yearly attacks of bronchitis, symptoms of distressing dyspnœa, orthopnœa, frequent violent paroxysmal cough, with subsequent sleeplessness and difficulty of expectoration, are present. This class of cases is one which so often resists the modes of treatment

usually employed. I have been struck with the marked relief to the dyspnœa, which is invariably the first symptom to be benefited, as I can testify from personal experience.

Another remedy which I have found of the utmost value in the treatment of chronic bronchitis is trinitrin. In cases where there are great dyspnœa, high tension, and signs of a struggling right heart, it affords marked benefit. To take my most recent instance: John D., aged fifty-five, a carman, was admitted October 30, 1896, complaining of severe cough with shortness of breath, attacks of dyspnœa especially at night, thick muco-purulent sputum; had had a winter cough for fifteen years and hæmoptysis one year before. On admission the dyspnœa was considerable, especially on exertion. There were very limited respiratory movements of the chest walls; the heart dulness was diminished; tympanitic note, air entry deficient, cooing rhonchi heard all over the chest; slight œdema of legs and orthopnœa. I ordered him the trinitrin tabloids every four hours. He was rapidly relieved of the dyspnœa, which in about ten days practically ceased to give him the slightest trouble.

Another case in which the spray gave much relief was that of Robert F., a traveller, aged sixty-two, who had suffered from winter cough for four or five years. Latterly his cough and breathing had been becoming more troublesome and difficult, and his legs had commenced swelling. On examination, his chest was found to be markedly emphysematous; there was no albumen in the urine. He was put on the vinum ipecacuanhæ spray, which gave him very decided relief with regard to the dyspnœa and the difficulty of expectoration.

Similar to the above case is that of Thomas K., a packer, aged fifty-five, who had been subject to winter cough for many years, with distressing attacks of dyspnœa. He had never had any other illness. His chest was found to be extremely emphysematous. Under the spray treatment he much improved and found great relief to his dyspnœa.

In another patient, aged sixty, the subject of winter cough for many years, who had very distressing dyspnœa, with lividity, and in whose chest there were found marked rhonchi and sibilous and scattered râles, the trinitrin administered every three hours afforded marked relief. In this case there was also high arterial tension.

It has seemed to me that it is especially useful in just those cases

where bleeding is indicated in order to relieve the right heart, but, whereas bleeding gives relief directly by removing a portion of the burden of the right heart, trinitrin affords assistance to it indirectly by its vasodilator effects, thus promoting the suction action of the left heart; in this way, it may be regarded as a *vis a fronte*.

I order the trinitrin to be given every two, three, or four hours, according to the severity of the dyspnœa: it must be given frequently to be of use.

Probably the new vasodilator erythrol tetranitrate would be equally, if not more, beneficial, as its effects are more prolonged.

In cases where there is only a moderate degree of dyspnœa tar is very valuable. It can be given in various forms, but none surpasses, in my opinion, the compound syrup prepared according to the United States Pharmacopœia. I am in the habit of using it largely among my out-patients, with good results, giving it frequently as a linctus. Tar is highly recommended by Whitla in the form of tar-water, in doses varying from a teaspoonful to half a pint. Another advantage of tar is that it is very cheap, an important point in hospital economy. Sometimes the addition of from four to six minims of a two per cent. solution of apomorphine is useful.

Terebene has been largely advocated in the treatment of chronic bronchitis. A very useful way of giving it as an inhalant is to fill the bowl of a pipe with cotton wool on which a few drops are poured. The patient can very conveniently inhale it while at work. Several of my out-patients have derived much relief to their dyspnœa in this way.

Lastly, for the relief of fetid bronchitis and bronchiectasis, inhalation of the fumes of crude commercial creosote in a small chamber, as advocated by Dr. Arnold Chaplin, is valuable. I had under my care last year a very striking case in point: A man was admitted with constant troublesome cough and most foul expectoration, loss of appetite, and a high temperature at night. The creosote chamber afforded very marked relief, both as regards the amount and fetidness of expectoration and the reduction of temperature. The physical signs were those of a dilated bronchial tube in the lower lobe of the right lung.

THE TREATMENT OF CHRONIC CONSTIPATION.[1]

CLINICAL LECTURE DELIVERED DURING THE POST-GRADUATE COURSES, 1898, IN THE UNIVERSITY OF BERLIN.

BY PROFESSOR THEODORE ROSENHEIM,

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LECTURE II.

Gentlemen,—Chlorotic anæmic patients especially often have a capricious appetite for sweets and sours, which the doctor usually thinks it well to never let them yield to. They eat pickles and lemons with a relish that other people cannot understand. Do not let prejudice alone rule. Let them eat more or less according to their tastes, as far as their stomachs allow it, and see what results. Often you will find that a pickle or a lemon will be followed by other things that they would not otherwise eat. Above all, do not counsel in these cases the bland, unirritating diet so often advised.

Eggs and milk, if they form the main part of the diet, are liable to serious objections. To this milk is not so open, for it is the form of albumen which is least liable to putrefactive changes in the intestine; but eggs, especially the whites of eggs, are to be avoided for this reason, and I often have my patients eat only the yolks, which are fatty and very nutritious. The whites of eggs give very concentrated albuminous chyme, which during its abnormal retention in the intestine is liable to various chemical dissociations; various lower and higher albumoses are formed, which, when absorbed, act as toxines. The theory that chlorosis is an intoxication due to the absorption of such abnormal albumoses from the intestine has a good deal to support it, was upheld by distinguished clinicians,—*e.g.*, Sir Andrew Clarke,—and is certainly at least partly true in every case.

Then, as to sweets, do not always condemn them on general principles. For many people they form an important and easily assimi-

[1] Reported by Dr. James J. Walsh, Berlin, Germany.

lable article of food. It is true they are liable to acid fermentation, —*i.e.*, to chemical processes of dissociation, which result in the production of gas—usually carbonic acid—and of various organic acids; but the two things which modern chemical investigation of intestinal processes has shown to be the most effective stimulants of peristalsis are exactly gases and acids. When not produced in excessive quantities they provide just the necessary stimulus.

I have at present under my care a patient who lives almost entirely upon starches and sugars, has a much better appetite than when, under the direction of unfounded and narrow prejudice, she avoided them, and has no trouble from constipation, which used to be the bane of her life. I repeat it, then, be perfectly open to the belief that patients do not need to follow the same *régime* as you do yourselves. They may get along wonderfully well on what would utterly disagree with you, or most people whom you know, while they would not be able to keep up at all on what just suits you or your other patients. Of course, the examples that I have quoted from my own experience are extreme cases. They are by no means meant to furnish a rule in the matter of diet for intestinal trouble. I hope that their prominence and importance, as exceptions to supposed rules, will be an incentive to you to study your patients and not submit them to ready-made dietaries which may not at all suit them.

Our patient here must eat more, then, especially of vegetables, because they leave more residue and so furnish material for the proper exercise of peristalsis. This is the most important thing in the treatment, yet the one I will insist on least, as every writer on chronic constipation has dwelt on it of late years, and you must thoroughly appreciate its importance. I should warn you, however, against a too exclusive vegetable diet, for that of itself is capable of producing an atonic condition of the intestines, and is a fruitful source in vegetarians of chronic constipation. A certain amount of animal food must always be given; in fact, it should form a good part of the principal meal.

If our patient here has a special taste for sweets, I shall encourage her to eat plenty of dessert. Not pastry, if it disagrees with her, meaning by that if it causes heart-burning, or acid eructations, or dull, sleepy feelings, as sometimes happens, but well-made puddings, rice and sago, and the like. If she cares for lemons, I shall permit her to take one, or even two or three if they agree with her, and

three or four oranges a day, and shall have no objection to her eating an occasional pickle, especially at the beginning of a meal, if she finds that instead of dulling it sharpens her appetite for other things.

I shall insist on the plentiful use of butter and fat and things cooked in fat. Sometimes these are not borne well,—*i.e.*, they lower the appetite at succeeding meals, which is the best criterion in the matter, and then they should not be continued. Fats, however, during the course of digestion are changed into the fatty acids, and acids are, as I have said, one of the best stimulants of peristalsis. A serious effort must be made to provide fats in a palatable form, so that they will bring with them no unpleasant after-effects.

Curiously enough, when one form of fat is not borne well, another may be. Sometimes when butter, used plentifully, disagrees, things prepared in hog's lard do not, while, when neither can be borne, goose fat or some of the vegetable table oils (not always olive oil, it is to be borne in mind) may prove palatable and digestible.

Even under normal circumstances from one-third to one-half the fat ingested is excreted. Its plentiful presence in the fæces makes slippery, easily movable masses, and somewhat hinders the absorption of water from the fæces. Besides, the fæces under these circumstances are moved along so easily under the action of peristalsis, that time is not given for that absorption of water which leaves the dry, hard, painful scybala that so often bother these anæmic, constipated patients.

Of course, plenty of liquid must be taken, to make the stools of the proper consistency. This would seem to be self-evident, yet the fear of disturbing digestion is another antique tradition that has given rise to a prejudice which sometimes keeps patients from taking enough liquid at meal-times, and there is no special call for it at other times. Patients should always be warned to take plenty of liquid, not only during meals, but between meals. This of course must not be carried to excess either, and a pint of liquid at a meal is sufficient.

As to what the liquid shall be depends, as in the matter of food, on the taste of the patient and his personal experience as to its action on him. Plain water is best for most people, but beer or coffee may be taken, and sour milk and buttermilk often have almost a specific action against the constipation. My experience with patients shows me that, as a rule, red wine, tea, cocoa, chocolate, and thick soups are to be avoided. In general, much soup is not to be

allowed, for a quantity of warm liquid still further relaxes the intestinal walls at a time when, on the contrary, they should be aroused into activity. For this reason liquids should, as a rule, be taken cold. A glass of cold water in the morning will often be followed by the desire to go to stool, and an evacuation occurs which would not have taken place but for the reactionary stimulation of peristalsis. In this matter, however, as in every thing else in intestinal therapeutics, there is no rule without exceptions, and you will find patients on whom a glass of cold water has no effect, while warm water has.

Exercise and fresh air are very necessary for such patients, but in this matter, too, doctors, to my mind, make serious mistakes. The general rule is for doctors to tell patients bothered with chronic constipation to get out in the air all they can and take all the exercise possible out of doors. The result is the patients walk out for hours, and, having often been used to a sedentary life before, they perspire sensibly and insensibly, and a good deal of water is given off from the skin and especially from the lungs. Nature supplies the place of this by absorbing more fluid from the intestinal tract. A very natural thirst causes more water to be drunk, but this, too, is absorbed and passes off partly through the kidneys and partly through the skin and lungs. The dried intestinal contents do not readily get a chance to reabsorb water, and so a severer condition of constipation results. I think most of you will recall that the day after a long pedestrian tour you were, though your bowels may have been perfectly regular before, somewhat constipated, and the fæces passed were drier and harder than usual and passed with more difficulty.

Exercise has a place in the treatment of chronic constipation, but not in the form of simple walking in the open air. Henoch has insisted on the reflex action of leg movements on peristalsis, but the value of the leg movements in walking have been certainly overvalued. Where the patients live in the city it is often positively harmful. Anæmic and neurasthenic patients, the most liable to this atonic form of constipation, are very sensitive to external influences on their nervous systems, and every time the heel is brought down upon the hard pavements of the city it produces a slight commotio cerebri et medullæ spinalis (cerebral and spinal concussion). This does not affect the healthy, but in patients in whom vital nerve-force is already lowered it cannot fail to have an evil effect. It is often combined with the ill effects of the noise and bustle of the streets,

the glare and heat of the sun, and its manifold reflections, all calculated to be still further harmful to supersensitive and weakened nervous organizations.

If patients can walk on the yielding turf of meadows or along clayey country roads, then, perhaps, a gentle walk may do them good, but I have found gymnastics at home much better and much more practical, as a rule; and especially is the bending of the legs good. I instruct a patient to grasp a door-knob, or some similar object, and let themselves gently drop to a sitting posture, and then slowly rise. They are to do this until slightly fatigued, and must be distinctly told so. As a rule, in any recommendations you make to such patients the limits must be carefully pointed out, or they will overdo the thing and do more harm than good.

Then I suggest bending exercises and turning the body from side to side, on the hips as a socket. Such exercises develop the abdominal muscles, and so furnish a better support for the muscular action of peristalsis; besides, the movements act reflexly on peristalsis itself. Such sets of movements may be done a number of times a day, each time just to a gentle sense of tiredness, but not to fatigue. A similar set of movements is employed in rowing, also in bicycling, the bending in the first and the alternate contraction and expansion of the iliopsoas muscles in the second causing very beneficial massage of the intestines. But patients must be warned about carrying these too far, especially the latter, bicycling, which has become so fashionable of late, for it is not the panacea for every ill that it is sometimes enthusiastically represented to be, and in delicate individuals and sensitive conditions of the intestines I have seen it do a great deal of harm. In catarrhal conditions it always does harm.

Hydrotherapy often does a considerable good, and should always be used in these atonic cases. No single therapeutic method is ever to be depended upon, but several must be employed at the same time,—diet, exercise, massage, hydrotherapy, and then, at the beginning of the treatment especially, certain drugs, though these should be dispensed with as soon as possible. In hydrotherapy the indications to be always kept in mind are stimulant and gently excitant measures, not soothing ones. On general principles a Priesnitz bandage at night is sometimes recommended,—a wet towel thoroughly covered to prevent evaporation,—but this has just the oppo-

site effects to the one desired. It still further reduces intestinal tone and quiets even the gentle peristalsis that exists.

Hydrotherapy to be successful must be a little vigorous; for example, cold baths of 22° R. (80° F.), with douches at 18° to 20° R. (72° to 75° F.), usually in fine streams, but also in large streams, as from a pitcher, cool Sitz-baths 15° R. (68° to 70° F.), patient to sit in water to the navel, but only for two minutes, then not dried by rubbing, but the excess of moisture removed by mopping and the patient put at once to bed. Finally, the Venus girdle instead of a Priesnitz, the wet bandage being worn for some time, but without being covered, thus allowing evaporation to take place with rapid extraction of heat and consequent vigorous reaction. These are methods that Pastor Kneipp has made popular, and there is no doubt that they often do a great deal of good. Patients will object at first owing to old prejudices as to taking cold, but once persuaded to try them, these hydrotherapeutic methods become favorites.

Massage is, of course, to be employed, but others have said so much of this that I do not need to go into it. Always remember that the kneading of the abdomen should proceed more or less in the direction of the large intestine, and that an actual mechanical helping along of fecal masses that have begun to accumulate is a very practical and practicable manœuvre. Electro-therapy is the least useful of the therapeutic methods in chronic constipation, although it is often of service in connection with other methods. Mere electrical excitation of the abdominal muscles can scarcely be hoped to do much good, and I have always believed in the insertion of one pole in the rectum while a large electrode was placed over the abdomen.

As to drugs, remember that all purgatives are irritants, advertisements to the contrary notwithstanding. A non-irritant cathartic exists only in the imagination of the pharmacist or manufacturer; even the mild castor oil, it has been recently shown, does not act merely by its fatty nature, but by being split up with the production of a gently irritating acid principle. One may substitute for drugs, then, other irritants mixed with the food; common salt, for instance, and salted articles,—pork, fish, etc.,—are excellent, and the constipated should be encouraged to oversalt their food slightly. Then raw fruit, fruit-juice, and preserves have this irritant action. The use of these may, however, be carried too far because it is supposed

to be nature's method. It is a question whether the gentle irritation of a small quantity of some mild purgative is not less injurious than the irritation of a large quantity of raw fruit or prunes or other preserves.

My favorite purgative in light cases is milk-sugar, which I have the patients use in considerable quantities in place of ordinary sugar in sweetening their coffee or over their desserts. It is, of course, very nutritious. When I give other remedies, they are in small amounts, taken rather often, so as to produce gentle continuous irritation and so persistent peristalsis, and not explosive outbreaks. Of one of the stronger common salt waters, as the Ems, I give from two to three tablespoonfuls in a glass of carbonated water, or a spoonful of bitter water,—Apenta or one of the other Hungarian waters. They are scarcely to be tasted when given thus, and are often effective. Of other drugs, I sometimes use cascara and rhubarb, and in plethoric cases occasionally aloes and podophyllin; scarcely ever do I use colocynth or any of the drastic purgatives.

For the two or three weeks while the patient is gradually getting hydrotherapy, massage, and electricity, we must do something to secure evacuations. There must be no anxiety about this, and the patient must not be allowed to worry if a stool does not occur every day. Allow the fæces to accumulate for two or three days, and see if a natural movement will not take place. Then give an injection, usually of cold water. Patients must not be allowed to give themselves large injections, however, for they only do harm and further relax and dilate the gut. Sometimes the injection of a little glycerin or the insufflation of a little boric acid will have the desired effect. These measures must not, however, be often employed, as they lead to hyperæmic conditions of the bowel and to proctitis. The bowel becomes accustomed to them, and larger amounts must be given, increasing the tendency to inflammatory disturbance. As a rule, if after three weeks of the *régime* that seems indicated, voluntary evacuations do not take place, there is something faulty in the technique of the application of the various therapeutic measures, or else it is not a pure atonic condition you have to deal with, and there are some other etiological factors that you must look for before proceeding farther.

Now let me present to you a patient who also comes with the complaint chronic constipation, yet in whom the treatment must be

in striking contrast to that of our first patient. This form of constipation occurs oftenest in women, though it may be observed in men too, not infrequently. The history here is characteristic: she is a neurotic individual who recalls that after indiscretions in diet, after spiced food, sometimes after the eating of ices, she had attacks of diarrhœa which were followed by constipation. After awhile the constipation became the distinctive feature of her case, and has persisted. There are some points especially tender to pressure in her abdomen, particularly in the left iliac fossa in the region of the S romanum. Other points that are sometimes tender in these cases —the splenic flexure and the cæcum—do not seem so much affected.

Her stools, of which I have a sample here, are interesting, and really give the key to the case. You see that they are in thin, drawn-out pieces, with the occasional occurrence of small spherical bodies, that would remind one of sheep's dung. They contain a good deal more slime than is normal, and the mucus is mixed with the fecal masses, not merely coating them, as you can see in these pieces broken for the purpose. Where stricture can be excluded, these "lead-pencil" stools and the "sheep-dung" bodies are almost pathognomonic of a spasmodic condition of the colon. It is to be remembered, however, that at times these "sheep-dung" bodies occur in atonic conditions as moulds of the pouches of the large intestine, and that in any case this is what they represent, and their diagnostic significance must be judged from accompanying circumstances.

The presence of the mucus tells the story of the origin of the enterospasm. There is a catarrh of the intestine, and the inflammatory condition has led to irritation of the underlying muscularis, with the production of spasm. The generally lowered tone of the nervous system in neurotic patients makes the occurrence of spasm much easier. One thing is to be borne in mind in diagnosing catarrh from the presence of mucus in the stools: it must be in considerable quantities and must be mixed with the fæces, for in ordinary atonic conditions the lying of fecal masses in one place for some time leads to their being coated with mucus even when no inflammatory condition is present. Now, our treatment here must be the direct opposite of that in the other case. To tell this patient, because she complains of chronic constipation, that she should take more food, of a more irritating character, that would leave a larger residue, to prescribe irritant drugs, with exercise, massage, and hy-

drotherapy, all this would simply make the condition worse. The indications here are for rest and warmth, with, as far as possible, an absolutely unirritant diet.

We shall advise her to wear a Priesnitz bandage every night (a wet towel thoroughly covered to prevent evaporation, thus giving the sedative effect of moist warmth), while during the day she shall wear such a wet bandage covered with wool and a layer of india-rubber. She must avoid all severe exercise and rest as much as possible on her back, especially after meals. Her diet for some time must be almost exclusively milk, with only an occasional egg, but a plentiful use of fats. Not much dark meat must be taken, as it contains irritant extractives; white meats, however, may be allowed, especially in the form of calf's cutlets. Cheese is usually too irritant, though the casein of milk is not so.

There must be no massage, no electricity, and only gentle hydrotherapy. Luke-warm baths, with rest in bed afterwards, sitz-baths (not cold), and with gentle rubbing, afterwards followed by sweating in bed. For the bringing about of evacuations, warm water injections (never cold water) and always in small amounts. Sometimes even the warm water injections prove too irritating, when warm oil should be substituted. Not much need be given at a time. A small amount of olive oil at 40° C. (102° F.) is injected into the rectal ampulla, and the patient is put on her back with the hips elevated for an hour. Then a bit of cotton is put over the anus, and the patient allowed to move around, as on a filter paper the oil finds its way by diffusion up the colon. The next day the procedure is repeated, also the third day if necessary, but usually by this time the fecal masses have become impregnated with the oil, and a movement has taken place. As the oil wanders up to the transverse colon, the catharsis is usually most complete. There is a thorough "cleaning out" of fecal masses from all parts of the intestine which water would never give.

Gentlemen, I know that I have by no means touched on all the points, even the practical ones with regard to chronic constipation, and at the end of my clinic there remains so much to say that I feel dissatisfied with it, yet I shall be content if I have impressed upon you some of the points upon which a rational therapy of chronic constipation is founded, for it is one of the most difficult things we have to deal with in disturbances of the digestive tract.

THE TREATMENT OF TUBERCULOSIS.

CLINICAL LECTURE DELIVERED AT THE CHILDREN'S HOSPITAL.

BY PROFESSOR J. GRANCHER,

Visiting Physician to the Children's Hospital, and Professor of Medicine in the Faculty of Medicine of Paris.

LECTURE IV.

GENTLEMEN,—Tuberculous patients are in greater need of food than healthy persons. To begin with, they require food to make good the ordinary loss to the body by wear and tear. A grown person with average appetite, taking three meals a day, will derive, from the variety of articles of food of which they are composed, the amount of albumen, fat, and starchy substances necessary for this purpose. Meat, fish, and eggs supply the albumen; milk, vegetables, grain, seeds, and alimentary pastes the starchy substances, and also fats and nitrogen; so that when a good digestion insures proper assimilation of these materials, physiological nutrition is amply effected by the ordinary three meals. This is for a person in average health.

For tuberculous persons, on the other hand, physicians must, whenever circumstances admit, prescribe at once, in addition to the normal diet, an extra allowance of food to be used in regaining a condition of health. Unfortunately, this requires a digestive apparatus in excellent condition, and we have seen that such is far from being the case with these patients.

The physician must be well up in the forms of food best suited for tuberculous patients of all varieties, and must know what articles are specially adapted to help them to recovery.

My firm conviction is that nitrogenous food is best adapted to this purpose, and although this class of patients is almost universally advised to consume as much fatty food as possible, I place the latter quite in the second rank, and only even then if the stomach and intestine can digest it, which is far from being always the case. This therapeutic idea is based on the histogenesis of the tubercle, and, without going into any detail, let me remind you that the pro-

cess of defence adopted by the human system against the tubercle bacillus consists in the bacilli being absorbed by the white globules, which perish in the attempt and are then isolated and encysted by the cells of whatever tissue they may be in, while around them is built up a barrier of fibrous tissue, which may or may not ultimately become infiltrated with lime. Now, the cells that accomplish this encysting, and that form the fibrous tissue, are small particles of living, nitrogenous matter; it is, therefore, easy to see that the best way of coming to their aid, of encouraging their development and action, is to supply the system with the substance of which they are composed.

Consequently, the extra food allowance given to a tuberculous patient to aid in recovery should be more particularly of a nitrogenous nature.

Were the arguments derived from cellular biology, and the knowledge of nature's method of procedure, not sufficient to carry conviction on this point, there are other, indirect, proofs equally effective. Thus, the remarkable action of raw meat pulp, or of meat powders, is altogether due to their nitrogenous nature; they represent in a compact and easily assimilated form, almost pure nitrogen, whence their specific action in cases where the disease has not got beyond a certain point.

I do not mean to imply by this that other forms of food, fats or hydrocarbons, are of no assistance to the cells of the body in their struggle against the tubercle bacillus. The human system not only has to make good its regular working deterioration, and to endeavor to mend any damage it may have sustained, but it also furnishes heat and work; for this reason fats and hydrocarbons, of which a given weight produces more calories than an equal amount of nitrogenous matter, are indispensable to life.

Therefore the "recovery" food allowance should not be exclusively nitrogenous, but largely so. In an ordinary, slow case of tuberculosis, I compose this allowance of two or three soft-boiled eggs, one hundred grammes of raw meat pulp, and a starchy soup, which should be added to the ordinary diet little by little, or at once, in cases where the digestive apparatus permits it. This extra-food-supply should be distributed over the various meals of the day, —the eggs at breakfast, the raw meat pulp at lunch and during the afternoon when a supplementary meal is tolerated at that hour, and

the thick soup (peas, lentils, rice, barley, Tapioca, Italian pastes) at dinner.

Opinions differ very largely as to whether other substances—alcohol, for instance—cannot be added to this "recovery" allowance with benefit. Even among physicians of special experience in the treatment of tuberculosis, some give whiskey in large amounts, others forbid it altogether. Thus, Dettweiler, whose competence no one can question, says, "Pure cognac is of the greatest service. In cases of great impoverishment of the blood, or of contined fever, its methodical use is of very great benefit. The patients should take for weeks, besides their wine at meals, a teaspoonful of cognac every two hours, the total amount per twenty-four hours being from seventy to eighty grammes, or one thousand and fifty to twelve hundred grains. The almost immediate effects are a sensation of warmth, slight stimulation, and disappearance of vertigo and tightness of the head. Alcohol, properly handled, is a powerful remedy; for the consumptive it should be not an article of luxury, but of necessity."

I have already mentioned the fact that Fuster gave each day one hundred grammes, or fifteen hundred grains, of brandy with his one hundred to three hundred grammes, or fifteen hundred to four thousand five hundred grains, of raw meat pulp.

On the other hand, here is what Bennett writes: "As for me, I am convinced that the stimulating and invigorating effect of spirits is a snare for these patients. It conceals their weakness and gives them fictitious strength and deceptive energy, but only for the time being; as soon as the stimulating effect is over, their weakness and mind depression are greater than before." It is true that Bennett speaks more particularly of the use of alcohol in large doses, as a little farther on he says, "Spirits in small quantities render real service, as they quicken digestion and strengthen and tonify the system." He therefore approves of their use in moderation, but gives no figures.

Daremberg is of the same opinion: "Alcohol in small doses is useful to consumptives," and he advises it to be taken at the end of or between meals, mixed with eggs and milk or sugar and water; sixty to eighty grammes, or nine hundred to twelve hundred grains, in damp climates, and twenty-five to thirty grammes, or three hundred and seventy-five to four hundred and fifty grains, in the winter resorts of the Mediterranean, are enough. He looks on alcohol as a substance preventing tissue-waste and as a physiological stimulant,

but does not ascribe to it any virtues as a febrifuge or any power to hasten sclerosis.

I agree with Bennett and Daremberg in thinking that it is well to be moderate in the use of alcohol with tuberculous patients, as not only do we know that the alcohol habit renders the tissues an excellent culture-ground for the tubercle bacillus, but that the sclerosing action of alcohol is anything but proved. On the other hand, the fictitious stimulation it produces in the nervous system is only desirable when we wish to effect a momentary improvement of strength when it shows signs of weakening. Even then its local action on the stomach must not be disadvantageous, and the quickening of the heart action and general circulation must not be too pronounced. Thus, when alcohol sends the pulse up, or colors the face, I forbid it at once.

On the whole, I do not prescribe it very often, although, like other physicians, I have seen patients derive benefit from its use, or believe they did, which is not the same thing. I am not convinced that it is really of use, but I am certain that it may do harm, and this is sufficient reason for striking it out of the diet for consumptives, to whom it appears to give only a temporary impression of vigor. It will, therefore, best be reserved for short periods of loss of appetite, or even abhorrence for food, during which the diet has to be interrupted; in such instances a little alcohol given every hour in sugar-water keeps the system up until, after a few days rest, the stomach and intestines are again able to resume their functions. But alcohol by itself is incapable of making a single granulation of the cellular protoplasm.

These remarks apply equally to glandular liquids, in spite of the marvellous action of some of them on nutrition and the principal functions of the body. No one can deny the effect of thyroid preparations in myxœdema and obesity, and of testicular extracts in complaints of diverse orders; but how many deceptions do we not find even in the most reliable reports of cases; how many cures and improvements announced that do not hold good; how many firm convictions formed that afterwards melt away! That patients should be deceived in their own condition is the most natural thing in the world; but how can we explain the credulity of physicians, unless by their intense longing to be of service to their patients, or by their inclination to believe that the newest remedy is the best.

Now, as to artificial serums and glycero-phosphates. I do not deny their efficacy in improving the quality of the blood, nor in giving impetus to the strength in moments of weakness, although I have not verified this action in cases of tuberculosis myself, but take it at the word of physicians in whom I have confidence; even then I do not believe that their effect can be more than temporary and uncertain. In order to be more affirmative than this we should have to be able to separate, in the improvement noticed in a case, the proportion due to food, air, etc., and that due to the remedy. This is very difficult to do, as physicians rarely resort to one means only, but combine a number at the same time.

The claim has been advanced that creosote possesses the property of favoring this peribacillary sclerosis, but without furnishing any proof of this assertion. Creosote, to which I shall refer again later, is a good remedy, but we must not expect from it more than it can give,—namely, a reduction and modification in the muco-purulent bronchial secretions. To effect this aim small doses suffice, and I quite agree with M. Faisans's reserve as regards the systematic treatment of tuberculosis, by creosote. Not only does it not suit all consumptives, is not specific, and may be dangerous, but it acts, or appears to act, usefully only in cases where, to begin with, the treatment by food and air has been fully provided.

As regards Lannelongue's sclerogenic treatment, applied with success to surgical cases of tuberculosis, it appears to lend direct aid to the natural cure of tubercles by fibrous encysting. It is based on an accurate conception, and may in some cases give useful help to cellular effort. But it is easy to see that its action is too often exerted too far away from the bacilli, which require to be encysted as directly and closely as possible. We ought to be able to set up cellular reaction at the proper moment about each bacillary focus, which is impossible with the bones of the body, and, *a fortiori*, with the lungs. In the latter organs every attempt has failed to apply local modifiers, antiseptic or irritating, to the tubercles in evolution.

Cod-liver oil, on the other hand, is a very efficacious agent in tubercle healing, and, like every one else, I have witnessed the valuable service it renders to patients who can tolerate it in large doses (eight to ten tablespoonfuls per twenty-four hours) without distaste, nausea, loss of appetite, or diarrhœa. The main condition for success with oil is that it should be used as a complement to the normal,

working diet of the patient. In this way it belongs to the "recovery" food allowance, like which, it should help to increase not only the strength of the body, but of the digestive apparatus. In this way only will oil be of advantage to the patient. When a patient can only take it in small quantities,—one or two tablespoonfuls for instance,—or otherwise lose appetite and upset digestion, the oil had better be abandoned and replaced by a cutlet or two eggs. It is in reality a food, not a remedy, and is particularly efficacious in children who, as a general thing, digest it much better than adults. In addition to this, the glandular tuberculosis of children is influenced to a greater degree by its action than visceral and especially pulmonary tuberculosis. I have frequently seen large cervical glands, that had resisted all sorts of treatment, disappear with surprising rapidity in children from eight to fifteen years of age, who could digest five or six spoonfuls of oil. It therefore favors the absorption of the cellular accumulations about a few bacilli,—the anatomical characteristic of glandular tuberculosis. Less active than tincture of iodine and iodide in tracheo-bronchial glands, it is superior to that preparation in that it combines the atrophy produced by the iodine with the fatty food substance so easily assimilated when it is readily tolerated by the stomach.

It is a question of age, person, and habit, with cod-liver oil. It should be given first in small doses, which should then be slowly increased up to the useful dose, which is not less than from six to eight tablespoonfuls for a grown person and from three to four for a child. The way in which it is given, the hour, and the preparation should be varied; as a general thing, it should be taken with food. Whether or not it directly favors sclerosis is another matter. Besides the fatty substances, it contains, to be sure, phosphates, phosphoglyceric acid, etc.; that is to say, organic compounds that enter into the molecular composition of nuclein. The absorption of these substances may noticeably stimulate cellular nutrition, especially as the oil is given as an article of food; and since the nutritive process around each bacillary focus only asks to turn in the direction of sclerosis, anything that will favor cellular nutrition will act in the same direction and tend to that form of recovery. Thus, as a food it acts as a help to sclerosis, and as an iodine compound it tends to reduce glandular enlargement, both of which points are of benefit to the patient.

It cannot, however, be too plainly understood that, although cod-liver oil is probably the most valuable agent we can bring to bear against tuberculosis, it must be classed second to feeding, to which it is only an adjuvant and complement, and the elements of which it must in no case displace; but it can be placed with great advantage among the elements that go to make up what we have termed the "recovery" allowance of food.

CARE AND TREATMENT OF PHTHISICAL PATIENTS.[1]

BY MARTIN MENDELSOHN, M.D.,

Private Lecturer on Internal Diseases in the University of Berlin.

I TAKE the liberty of speaking in this debate on the combating of phthisis, in order to lay before you some observations on the importance of the care of patients suffering with tuberculosis of the lungs, because there is no other internal disease in which proper care is so important, nor is there any other disease whose treatment shows so clearly that the measures taken for such care are actual and independent therapeutic factors; and, when once these factors are applied in equal compass and with equal intensity in the other internal diseases, it will be shown that they are of no less curative value in them than in phthisis.

Now, this curing of phthisis is most surely and far-reachingly effected by the method of treatment which people have gotten into the habit of calling the "hygienic dietetic" method, a method whose superiority over all other ways of trying to cure phthisis is clearly enough shown by what we have heard in our meeting here to-day. Let us cheerfully admit that all other methods, however widely and thoroughly they have been tried, have had to be abandoned, and that the medicinal treatment of phthisis in particular, though applied from so many points of view and with so various medicaments, has had no palpable success whatever. However useful iodoform may be in tuberculosis of the joints, and lactic acid in tuberculosis of the larynx, the internal administration of medicaments in tuberculosis of the lungs leaves us entirely in the lurch; and of the tuberculines of older and newer origin you will allow me, I dare say, to be silent. The hygienic-dietetic treatment, on the other hand, is at the height of recognition and success, a recognition into the precise details of

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[1] This lecture was intended for the "tuberculosis sitting" of the Hygienic Section of the Naturalists' Congress at Brunswick.

which it is the less necessary for me to go in this assembly, as the good results of this method, results hardly even dreamt of in former times, are adequately discussed by others who are authorities on the subject.

But, if these results are great and extraordinary, on what are they based but on systematic, scientific care of the patients? On this fact alone, which, under the scourge of necessity, has been so completely elaborated with all the means of clinical experience, and so accurately determined in accordance with its indications and effects, in this one disease of pulmonary tuberculosis, in this eminent case of a wide-spread malady defying all other methods of treatment, could these favorable effects be produced, amounting in many cases to complete cure. For, if we always speak of the hygiene and the dietetics of pulmonary and laryngeal consumptives, I will admit that this accords with present use and wont; but "hygiene" and "dietetics" are normal, physiologico-prophylactic conceptions, prescriptions for healthy people, not for the sick; and it would be highly advisable to designate the aggregate of all these prescriptions and measures, so far as they apply to the sick, not as the hygiene but as the care of the consumptive. That is no mere quibbling or quarrel about a word; but I wish to bring out, by this more exact expression, the fact that this care is a therapeutic method, *per se*, that its aids and measures may become therapeutic factors in all other groups of internal diseases just as much as in pulmonary tuberculosis, and that the measures so taken are just as much means of cure as other therapeutic influences.

It is necessary, however, and this must be regarded as one of the tasks of the immediate future of medical development, that these therapeutic factors be subjected to investigation and elaboration as exact and scientific as those which other therapeutic factors are, as a matter of course, required to undergo. Everything in nature that can stimulate any function of the living human organism, and thereby alter this function in any way, may also be used by the physician as a remedy,—everything, without exception. It is indispensably requisite, however, that medicine, just because it is a science, must accurately determine the physiological effect of each such stimulus beforehand, that it ascertain and apply it by the same methods and with the same definiteness, whether it proceed from a dose of arsenic, a cold douche, or the temperature of the sick-room.

Not till this be done,—not till the care of patients, which might also be called *hypurgy*,[1] possesses dynamics of its means of cure, a hypurgodynamics, just as medicaments have their pharmacodynamics, —not till then will it become apparent, even to the most reluctant, that the care of patients really is an art quite as valuable and quite as effective as the other therapeutic methods.

Even in the case of the disease we are now discussing, great as are the results already achieved in it, the reform I have indicated will be necessary to a considerable degree. For, though the care of patients is the curative method that has stood the test of experience better than all others, we must not forget that—well as Brehmer and his adherents knew what they were about when they practised and elaborated this hygienic-dietetic method, which, as I have said, I should prefer to call the care of pulmonary consumptives—the way by which it has been arrived at has been essentially empirical. Thus a special method of caring for pulmonary consumptives has been achieved, to which a considerably deeper basis has been given by very recent publications,[2] a great number of the prescriptions of which, however, rest on a clinico-empirical foundation, rather than on coherent facts investigated on the principles of exact pharmacodynamics. These coherent facts, however, must be ascertained in a universally valid manner. To create the general dynamics of the curative means of the care of patients, and consequently a general scientific method of caring for them, is the task of the immediate future; and this task must be performed ere the special care of pulmonary consumptives and that of all other groups of sufferers from internal disease can be placed on a foundation as definite as that on which other therapeutic methods rest. Of course such a task takes time, and not a few well-aimed experimental and clinical investigations and observations will have to be made before it will be possible to draw even the outlines of such hypurgodynamics with a fair degree of certainty.

But this must not prevent us from creating a special method of caring for patients, founded at first on an empirical basis, for the

[1] From *ὑπουργεῖν*, to apply remedies.

[2] E. v. Leyden on the Present State of the Treatment of Tubercular Patients and the Care of the State for them. Periodical for the Care of the Sick, 1897, Numbers 9 and 10. Felix Blumenfeld's Special Dietetics and Hygiene for Pulmonary and Laryngeal Consumptives, Berlin, 1897.

whole great category of internal diseases, such as has enabled us to combat with a large measure of success such a disease as pulmonary consumption, which was regarded till but lately as simply incurable. The great results that have been achieved in the combating of pulmonary consumption imperatively command us to apply remedies so valuable against other diseases, in the combating of which other methods of treatment do not so entirely fail us as in pulmonary consumption, and the remedies of care may be made most powerfully subservient to those other effective therapeutic methods, and often prove a preponderant, but always a considerable, aid to the attainment of the final therapeutic effect desired. For we see distinctly—we cannot shut our eyes to it, though it has never hitherto been clearly and definitely proclaimed, but I think in a discussion of the combating of consumption it must be frankly admitted—that all the important and effective weapons with which modern medicine goes to battle against consumption are simply and solely the remedies comprised under the designation, *Care of the Patient;* and success depends especially on the application of these remedies corresponding to the inmost nature of such care,—that is, on the simultaneous use of all these therapeutic factors at once and the utmost attention to detail. All the therapeutic factors which form the essence of our modern treatment of pulmonary consumption are without exception care-remedies, which can and must be used against other internal diseases with the same heedfulness and the same clearness of aim. What results they can achieve in the treatment of pulmonary consumption this discussion shows.

It is not necessary for me to go into the details of these therapeutic factors. One thing only I wish specially to single out and accentuate,—namely, that the modern successful treatment of pulmonary tuberculosis has absolutely nothing of a specific character; for that is just the great and tremendous step forward that the treatment of pulmonary consumption has taken: it has cast away all the peculiarities adherent to the treatment of consumption,—above all, the somewhat mystical influence of climate,—so that the treatment, the care, of consumptive patients can be carried out with the utmost success everywhere, the one thing needful being the application of the care-remedies, but then of *all* of them, without exception. But, if such good results can be obtained by the regulation of the position and bearing of the body, the systematic ordering of bodily rest

and exercise, the lengthening of the time spent in the open air, graduated mountain-climbing, the regulation of the administration of nourishment (not only of diet proper, but also and just as much of the regularity and character of the meals), and care for suitable dress; if these results are obtained in a specially high degree when careful tending, suitable arrangement of the sick-room, and judicious psychical influence on the patient—measures which I have called the somatic, hygienic, and psychical care-remedies[1]—are added; if, in particular, all these measures can be completed and intensified by removing the patient from his unsuitable surroundings and placing him in an environment which is specially prepared for him, and in which they can be applied in the widest possible compass,—all these are things that belong to the category, care of the patients: they are all care-remedies, remedies which must be applied in the treatment of all other internal diseases to the same extent as in that of pulmonary consumption. And the success will certainly not be less.

I thank you, gentlemen, for giving me an opportunity of pointing out, by reference to this far-seen example of pulmonary consumption, how important a factor care of the patient is in all treatment of disease. I have treated the subject in the way of brief statement rather than of detailed proof, because all your discussions here of the combating of consumption afford the most pertinent and irrefutable proofs of my assertions. And, therefore, I could have found no fitter opportunity of saying what I had to say than that afforded by this discussion, which shows once more that the most successful possible combating of pulmonary consumption consists in the completest possible application of the care-remedies. When once this fact is well recognized, it cannot but follow that internal medicine will apply these remedies to all its other patients in the same compass, with the same appreciation, and then certainly also with the same noble success.

[1] Martin Mendelsohn on the Care of Patients (Hypurgy), Leipsic and Vienna, 1897.

THE TREATMENT OF BRAIN-FAG AND INSOMNIA BY STATIC ELECTRICITY.

READ BEFORE THE LOUISVILLE MEDICO-CHIRURGICAL SOCIETY.

BY JOHN L. HOWARD, M.D.,

Resident Physician at French Lick Springs, Indiana, etc.

Static electricity has a powerful psychical effect, and in the hands of the unscrupulous practitioner is greatly abused, and lends itself readily to quackery. At the same time, the static battery is the most useful single instrument now employed in general practice for the relief of non-operative and non-septic conditions. To limit this current to the treatment of a few functional nervous disorders is the grossest error; and we have only to investigate the electro-physiology of the subject to appreciate its wide range of usefulness.

Endowed as it is with an enormously high potential force and a minimum of volume, its physiological effects are chiefly modifications of the ordinary vital processes without electrolytic alterations. It may increase, diminish, arrest, or otherwise modify these functional processes. It affects secretion, excretion, absorption, reflex action, sleep, respiration, circulation, and nutrition. Owing to its great diffusiveness, it affects the entire system in a limited degree.

Time nor space will permit me to now deal further with the electro-physiology of the subject, and to those desirous of information I will refer them to Dr. S. H. Monell's most excellent work, "A Manual of Static Electricity," published by William Beverly Harrison, of New York. This work is exhaustive, and treats with every phase of the subject, containing over six hundred pages.

When over-work, mind-strain, worry, and the like produce an exhausted mental state, two necessities are demanded,—disordered nutrition must be restored and sleep produced. In static electricity, we have an agent which promotes both of these. Its effect is an immediate sedative tonic which is very refreshing to the fatigued nerve centres.

Two methods of procedure may be followed in producing these effects: The Leyden-jar current with a negative foot-plate may be employed, passing a positive sponge electrode over the surface of the body as in general faradization, of which this method is a reproduction. By far the quicker and better method may be employed of positive electrification for a sufficient time to produce a restful feeling to the patient, followed by a strong negative spray upon the spine, and especially concentrated upon the cervical, cerebellar, and lumbar centres.

If vertex or frontal sedation is also indicated, the positive head breeze can be applied for five or more minutes; and where the muscular system is relaxed from want of exercise, mild positive sparks applied over the principal groups of muscles, for the massage effect, will close the séance. In employing this method the patient does not disrobe, often the clothing being necessary to heighten the effect.

Just here a word or two explaining the effects of these different currents may not be amiss. General electrification, called also static insulation, etc., is a mild tonic, and according to the pole employed may be positive or negative,—the positive being stimulating while the negative acts as a sedative. General electrification produces a pleasant, exhilarating sensation, and can be applied to the most sensitive or hysterical patient without the least discomfort. Monell describes positive electrification as "a most agreeable tonic in all debilitated or negative states of the system,—those neurasthenic, anæmic, malarious, cachectic conditions in which the patient is 'below par;' it is, in fact, an artificial positive electrification of the atmosphere," and he highly recommends it in swampy, miasmatic regions where we find an increase of negative electricity in the air.

The static breeze is the reverse of the preceding; the positive breeze being sedative and agreeable, while the negative breeze is an irritant. Both forms of breeze will relieve pain, in nerves or muscles, not due to a structural change. A neuralgic headache as well as the agony of a gouty toe will be relieved.

The static spark is essentially tonic in its effect, very deep-acting, and should be employed with caution. Its intensity may be made so great as to violently and suddenly contract the group of muscles to which it is applied; or it may be regulated to be almost imperceptible and mildly contract a single strand of a muscle. Sparks are of two varieties,—viz., the thick spark applied with a large brass ball

electrode, and the fine friction spark as gotten from a small tipped brass electrode.

As to the selection of currents, the time and duration of treatment, conclusions can be drawn from the following cases, treated at French Lick Springs during the past season:

Case I.—Mr. J., aged forty-five years, from central Ohio, with a previous history of vigorous health. A prolonged mental as well as physical strain during a strike of miners had left him completely "fagged out." He had resorted to alcoholic stimulants on which to "keep going;" had kept very irregular hours, with little sleep. He was treated by his family physician for several weeks for a persistent insomnia, and a paræsthesia over the course and distribution of the right median nerve, exhibiting itself by a feeling of cold and numbness, and at times the region was totally anæsthetic. Not deriving any benefit at home he came to the Springs. At this time, besides the foregoing symptoms he was very impatient, fretful, and apprehensive about the paræsthesia of his right hand.

He had been on the various hypnotics, and at that time was taking forty grains of trional to secure four or five hours' sleep. A suitable course of the waters and diet was prescribed. In the forenoon, positive electrification for ten minutes, followed by the breeze over the spine and affected arm and hand for five minutes, were used. Before retiring that night, general electrification followed by the positive head breeze for twelve or fifteen minutes was employed. The effect was as marked and brilliant as the most enthusiastic could desire: he slept six and a half hours (without trional or other hypnotic), his paræsthesia was improved, and after eating a hearty breakfast was hopeful and buoyant. That this first effect was in part psychical I freely admit.

For the four successive days the positive breeze followed by sparks was employed for fifteen or twenty minutes in the morning, and at night immediately before retiring the head breeze was used for twelve or fifteen minutes. At the end of the fifth daily treatment his paræsthesia had disappeared, and he was sleeping eight hours and longer each night. After three more daily sparkings for the massage effects, the electricity was discontinued.

Four months later he returned to the Springs for a week's visit, and, as he had been somewhat overworked again, he insisted upon daily treatments during his stay.

Case II.—Mrs. A., aged forty-two years, very wealthy, and living in a large Southern city. She had every comfort money could procure, was not inclined to borrow trouble, and altogether of a very lovely and even disposition. She had not reached the menopause, and had enjoyed excellent health up to nine months previously. The trouble had started with the grippe, she being confined to her bed for six weeks with this ailment. Convalescence was slow, and she had never regained her former strength. The diagnosis had been made of "nervous prostration," and she was advised to travel. She had been a sufferer from insomnia during the whole period of her illness, and had taken during this time the entire list of hypnotics without becoming addicted to any certain one. Sulphonal, trional, paraldehyde, the bromides, chloral, and even morphine and the various narcotics, were familiar to her in their effects. This insomnia, with a despondent mind, a very marked anæmia, and great muscular prostration were her chief symptoms when she arrived at the Springs.

She had been eating twice daily, mechanically; had no inclination for exercise, and was, in fact, too weak to stand unassisted, and had no desire for diversion of any kind. On the whole, this lady presented a common enough ailment for one of her social position and wealth, and many such patients seek health at the different resorts throughout the country. This case was one of many that came under my care at French Lick Springs, though none were affected to so pronounced a degree. It is a fashionable, though not necessarily an intentional affliction, and we may term it neurasthenia, for want of a better expression.

This patient positively refused to take the sulphur waters, but was otherwise very obedient as to following out the treatment. General faradization for the massage effect was used daily. Having a fair digestion, a highly nutritious diet was administered four times a day. Gude's peptomangan and strychnine as tonics, and trional as a hypnotic, were the drugs used. At the end of eight days she was able to be assisted to my office for static treatment, general electrification and the positive head breeze being used daily for the first week, and after that the sparks to the spine and most important groups of muscles were used in addition. The trional was discontinued, and no hypnotic administered after the second static treatment.

After the tenth daily treatment she would sleep eight hours or longer at night, and take a nap of an hour or so in the afternoon. This duration of sleep continued during the remainder of her stay of over two months. During this winter she has attended to her many social duties, and writes that she is in excellent health; but I would not wager that the giddy whirl of social gayeties does not cause a relapse of "nervous prostration."

Case III.—Mrs. S., aged thirty years, residing in southern Illinois, had buried her mother two months previously after nursing her during a prolonged sickness. Her mother would sleep during the day but never at night, when she would require almost constant care and watching. Mrs. S. had always led a very regular life and had enjoyed good health. She had never been able to sleep in the daytime, and when her mother required her attendance at night she consequently lost much sleep, only "dozing" for brief intervals during the whole course of the twenty-four hours. At the time she presented herself she was suffering with what we might term *habit insomnia*. She could never sleep over a fraction of an hour at a time, and had not averaged over two hours' sleep in the twenty-four since her mother's death. She was utterly miserable and very nervous, but not hysterical. She had obstinately refused to resort to drugs to procure sleep, but readily consented to the administration of electricity. The static breeze after the usual manner of procedure was administered twice daily, she having the idea it was being used for her "nervousness," and at no time did she receive the direct suggestion that it would produce sleep. The night after the first application she slept four hours, and before her two weeks' stay was up was securing between seven and eight good hours' sleep during the night. Quinine was the only drug used during the treatment, owing to a malarial infection. A natural chalybeate water was given for its tonic effect and as a blood alkalizer.

That static electricity unaided should be employed in the foregoing class of cases, I do not maintain. No electrical application is a direct and forcible sleep compeller; but I do contend that these electrical effects in indirectly overcoming the insomnias should be placed before the narcotics and active hypnotics in the list of therapeutic measures.

In chronic cases accompanied by anæmia and general neurasthenia, the restful and nutritional action of the static current should

be employed in conjunction with proper rest, out-door diversions, and suitable hygiene.

Lack of sleep may be due to causes which call for a narcotic, but these cases are radically different from those which are suited to static electrification. In the ordinary curable cases of insomnia, static electricity should be placed in the front rank as a curative agent.

THE TREATMENT OF BURNS.

CLINICAL LECTURE DELIVERED AT THE LOUISVILLE MEDICAL COLLEGE.

BY WILLIAM C. DUGAN, M.D.,

Professor of the Principles and Practice of Surgery and of Surgical Pathology in the Louisville Medical College, etc., Louisville, Kentucky.

GENTLEMEN,—This child is between three and four years of age, and comes to us to be treated for a burn of the face and body. She has a very bad burn about the face and upper part of the trunk, there being destruction of the skin and cellular tissue in many places.

With the introduction of explosive agents, such as coal-gas and gasoline for fuel and light, the manifold application of steam, the parlor-match in place of the red-sulphur match, etc., burns have become more and more common in spite of all provisions designed to prevent accidental injuries; so that this will be one of the most common casualties that you will be called upon to relieve. The explosion of the lamp and of the gasoline reservoir of the cooking-stove is common, oftentimes injuring several members of a family. Then there are the burns caused by chemicals, both acids and alkalies; but I shall confine my remarks to those injuries—scalds and burns—produced by caloric agencies. These injuries may vary in extent of surface from a small spot to the whole body, and in depth from a mere redness of the skin to destruction of the entire body or limb; so you must in your examination determine as far as possible the character of the burn to enable you to institute proper treatment and give an intelligent prognosis.

The most acceptable classification of burns is the American classification, which is as follows: First degree, redness of the skin, an erythema or blush; second degree, blistering resulting from destruction of the outer layer of the skin; third degree, where the entire skin is included, to the destruction of the cellular tissue, muscle, etc.

In burns of the first and second degree no deformity results;

while in those of the third degree there is always deformity, varying, according to the parts involved, from a smooth cicatrix to complete distortion of face or limb, producing the most hideous spectacle.

If we had seen this child at the time of the accident we would have found her in profound shock, with rapid pulse, cold, temperature subnormal, suffering great pain. Following those symptoms of shock, after a time there is reaction, the patient has fever, and children oftentimes have convulsions.

Cause of Death.—The causes of death following burns are: First, shock causes about fifty per cent. of all deaths from such accidents; second, exhaustion from suppuration and septicæmia; third, chest complications, such as pneumonia, pleurisy, and pericarditis; fourth, gastro-intestinal troubles; fifth, duodenal hemorrhage. The latter is a hemorrhage that comes on anywhere from five or six up to as many as thirty days, or even longer, after the accident. There have been a great many theories advanced as to the cause of this hemorrhage, but I believe no satisfactory explanation has yet been offered.

If the patient die from shock, convulsions are not uncommon, and these in turn are followed by profound coma and death; there may be no convulsions. In deaths from suppuration, you have the ordinary symptoms of septicæmia, chilly sensations, profuse perspiration, and after a while the characteristic sweetish odor of the perspiration; finally, death results from exhaustion.

In cases of duodenal hemorrhage, the patient may be doing well; you may have given a most favorable prognosis, the injured surface has commenced to heal, etc. You may be called suddenly, the history being given that the patient has fainted; on arriving, you find him in a state of coma, no color even to the lips, and death soon closes the scene. From such a history it will be easily understood that the patient has had a hemorrhage. The patient may have epigastric pain, and may occasionally vomit blood.

Prognosis.—When you are called upon to give a prognosis in a given case of burn where you find half the body involved, it makes no difference what the degree of the burn, it is always grave. The chances are that the patient will die in the course of a few hours from shock. Remember that the prognosis as to life in these cases is not according to the degree of the burn, but according to the extent of the surface involved. Burns involving certain parts of the body are followed by greater shock than other parts; therefore the

prognosis is graver,—viz., about the face, the neck, the genitals, the axillæ, chest, abdomen, etc. We can readily understand why this is so when we consider the underlying vital organs.

Complications.—There are many complications of burns, the more important of which I shall briefly consider.

Œdema of the glottis produced by the inhalation of steam, hot smoke, or flames, comes on suddenly, and must be relieved by tracheotomy or intubation to avert death from asphyxia.

Bronchitis and pneumonitis caused by the inhalation of steam, etc., as above, or by the intense congestion following reaction, or by contiguity of tissue where the chest is involved.

Enteritis and peritonitis (and duodenal hemorrhage) are very common in bad cases of burns. That abdominal symptoms are common is agreed, and several theories have been advanced to explain the pathology; but as yet none have been accepted. Congestion following reaction accounts for all except the hemorrhage resulting from perforation of Brunner's glands located in the first part of the duodenum. Since the perforation looks not like an inflammation, the explanation that "the alkalinity of the blood in these engorged glands is overcome by the acidity of the gastric juice and digested" is to my mind the most rational.

Albumen is found in the urine in most cases as soon as the temperature reaches 102° F., and in proportion to the rise in temperature is the increase in percentage of albumen.

Cerebral symptoms are common in nervous people and in children, and is a serious complication. We should differentiate between delirium from fever and that caused by congestion and inflammation of the meninges and brain. These symptoms are headache, convulsions, coma, etc., and are most to be feared when the scalp and face are the parts involved. Post mortem shows engorgement of the cerebral vessels with extravasation of serum in the severer cases.

Treatment.—The first thing you are called upon to relieve is profound shock, and the severe pain. If you have a warm bath in which to immerse the patient, it is the best thing you can do. Make the bath, say, 99° to 102° F. If the warm bath is unavailable, and you have some oil, anoint the part burned, envelop in soft gauze, and put the patient in warm blankets. While getting him ready for the blanket, give him an hypodermic injection of one-quarter grain of morphine. I should have said that the first thing to do in all cases is

to give your patient an hypodermic injection of morphine and atropine—morphine to relieve the intense pain, atropine for its effect in relieving shock—as a stimulant, and then in inviting the blood to the surface. I would repeat the injection of morphine one-quarter grain hourly until relief is obtained. If two-thirds, one-half, or even one-third of the surface of the body is involved, tell the friends that the patient will most likely deepen into profound coma and die, thus protecting yourself, so that, if following the injection of morphine coma supervenes and the patient die, the friends will not think death was caused by morphine.

The next thing, after you have relieved the shock by hot baths, or hot baths and flannels, with hot bottles of water placed under the bed-clothing around the patient, being careful to avoid burning him, and the hypodermic use of morphine and atropine, comes the question of local treatment.

Household Remedies.—One of the best local applications, and one which you will find in almost every household, especially in the country, is bread soda,—bicarbonate of soda. Make a paste of this and apply it over the injured surface, and over this an ordinary surgical dressing. Another household remedy is molasses applied by saturating blotting-paper with it, and then covering the burn with these strips. Another good domestic remedy is flour applied dry, using all that will adhere to the surface. Another domestic remedy is ordinary white paint. Carbonate of lead with linseed-oil is one of the most reliable dressings. Do not infer, however, that you should treat a patient by such local applications throughout the whole course of a burn; these are for the first few dressings only. If you have not the bicarbonate of soda and cannot get it, then take what is called carron oil, composed of equal parts of linseed-oil and lime-water, and apply that. Carron oil is best applied by saturating soft cloths and enveloping the parts in these, and then cover this with a thick layer of cotton.

Surgical Dressings.—The foregoing applications are called "domestic remedies," and are not so good as iodoformized oil, iodoform and vaseline, carbolic acid and vaseline, or something of that kind, to be applied as you would use them in other wounds. Carbolic acid acts faintly as a local anæsthetic, likewise does iodoform, and relief may often be obtained by the application of one of these agents. Over any of these applications should be placed plain gauze

enveloped with cotton, just as you would in dressing any other wound.

Changing Dressing.—When shall we change the dressings? If the patient is doing well, when the dressing is stained through you should remove it. If the patient is a child, and the burn an extensive one of the second or third degree, in removing the first dressing or two at least, remember that it is better to give an anæsthetic, because removal of the gauze, etc., gives the patient a great deal of pain. Give the little patient an anæsthetic, for it is necessary to thoroughly cleanse the parts and render them aseptic. By the third dressing you will have gotten the part cleansed; then you should treat it as an ordinary ulcer from that time on, changing the dressing only as indications arise.

Not long ago I saw in consultation a woman whose burn, of the first to third degree, involved about one-half the surface of the body. The skin and superficial fascia were charred, and looked like a coat-of-mail over her right shoulder and half of her chest, down under the arm, across the acromion process over the scapula, and back almost to the spinous processes. The family physician had changed the dressings every day, but had left this dead skin floating on pus. If you ever meet with a condition of that kind, take your scissors and remove the hanging skin and dead tissue. The amount of skin and dead tissue hanging from the burned surface in the case I have mentioned was sufficient to envelop two-thirds of this child's body. The pendulous mass was removed, but the woman was in an extreme condition of sepsis and died from its effects. You should remove all the dead tissue just as soon as you can. Be very careful to make your dressings complete. At first, the injury is a burn, *per se*, and you will treat it as such; later it becomes an ordinary healing wound, and then you should treat it just as you would a healing ulcer.

Burn Cicatrix.—Observe the lesion about this child's face, especially on the cheek-bone and neck, and you will see that it is beginning to close,—cicatrize. And this opens another important question, to wit, the deformity of burns, which is a serious matter about the neck, the flexure of joints, hands, feet, groin, etc. You have all heard a great deal about the progressive contraction of the cicatrix of a burn. Some authorities say if you follow it along you will find it is progressive; but if you will destroy the same amount of surface with the knife or otherwise, after healing takes place the

cicatricial tissue is going to contract just exactly as cicatricial tissue does following other injuries. The progressive character of a burn scar is simply because of contraction of the cicatricial tissue, just the same as from any other wound; and there is no more tendency to contraction of a burn cicatrix than any other; the only difference is that we have more surface involved in burns than other wounds, as a rule.

Prevent Deformity.—How can we limit the contraction of the cicatrix? By skin-grafting, plastic operations, and maintaining the parts in a normal position by splints, etc. In this case we have an extensive burn; the involvement is so great that the question of skin-grafting would naturally come up. You understand what skin-grafting is. When the lesion is located at a point where you can do plastic surgery, for instance about the axillæ, or about the flexure of joints, you may be able to remove the cicatricial tissue and dissect up a flap, swinging it around to cover the gap. By plastic surgery we can oftentimes accomplish wonderful results in overcoming these deformities. But what we desire in this case is to prevent such deformity as we have been discussing, and this is best attained by skin-grafting. There are a number of ways of doing this, of which the most satisfactory are those practised by Reverdin and Thiersch. The latter cuts long strips of the outer layer of the skin from the thigh with an ordinary razor, or an instrument for that purpose. The skin is made taut, and then with a very sharp instrument the surface is planed off and piles up on the blade of the instrument. These long strips are placed on the wound so as to cover the whole surface. Another very good method is to take a sharp needle and introduce it beneath the outer layer of the skin and lift it up; then with a delicate pair of scissors clip off and drop these small pieces of skin into a vessel containing normal saline solution. Then, with the surface of the wound cleansed and dried, these small grafts should be applied over the raw surface, planting them as it were. Of course, the more skin you use in grafting, the better is likely to be your result. After having placed the pieces over the raw surface, you apply some protective—such as oiled silk, or, what is better still, rubber tissue—which has been thoroughly sterilized. Place this over the wound, after which apply your dressing. This should be left intact for four or five days; then remove the dressing and carefully take off the protective tissue, taking it up gently, and on look-

ing at the wound you may be unable to find any sign of your grafts. If the wound seems to be doing well, reapply fresh dressing as before, which should be left on for three or four days longer; then the dressing is again removed, and if everything has progressed favorably you will find over the surface little areas of new skin of a bluish-white color.

Another method is to take scrapings from the skin, if you are unable to secure grafts in the manner already described. Cleanse the arm or thigh, for instance, and scrape off the outer layer of the cuticle, which is then sprinkled over the wound as small scales. Good results are sometimes obtained by this method of grafting. Sometimes skin is taken from a dead subject and placed on the raw surface. At times these grafts will grow just about as rapidly as those taken from the living person. Of course, in following this plan, you should be very careful to select a subject that has not died from any infectious or septic disease. You cannot be too particular about this. Some authorities recommend the skin of a frog for grafting. Carefully remove the outer layer of the skin from the front part of the bull-frog, and this may be used as above described without fear of pigmentation.

It is claimed that the foreskin obtained from a circumcision constitutes the best known skin-graft. It is a fact, that in some cases it has acted very nicely for skin-grafting.

If you are called to see a patient who has been burned on the inner side of the arm and the contiguous side of the chest and axilla, and you permit the parts to come in contact, you will find in the course of healing and cicatrization the arm will become adherent to the chest. I have known of suits for malpractice being filed as a result of this complication; the two raw surfaces being in contact will unite. How can this be avoided? First by applying a proper bandage well up in the axilla; the arm to be kept in abduction to prevent the two raw surfaces coming in contact. If the arm is even allowed to hang down by the side, the cicatrix will become contracted and the patient will be unable to elevate the arm. Abduct the arm and put on a triangular splint, just as you would in certain kinds of fractures.

To prevent deformity in this case, we will put on a dressing to keep the child's head elevated. Sometimes this is very difficult, and the instrument or support used for cervical vertebral caries is found

to serve a good purpose. Any dressing will be of service that will prevent the head from being drooped; this child should be made to keep its chin elevated while the wound is uniting. Sometimes you may have to use extension of the head in these cases.

With further reference to duodenal hemorrhage, I know of nothing that will give relief to this distressing condition. Outside of support and transfusion and infusion there is little to be done. I think none of you will venture to go down and ligate the artery. It may be accomplished, but has not been done successfully thus far. If your patient is in profound shock from duodenal hemorrhage, the only procedure is transfusion of blood from one subject to the other, or the infusion of saline solution; or what is called auto-transfusion,—that is, bandage the legs and arms, driving the blood back to the centre, and in this way you may prolong the patient's life for a short time until you can get your instruments ready for transfusion or infusion. Instead of injecting blood into the veins, as generally advised, I believe it is better to inject into the arteries, because there is no danger of getting any kind of an embolus into the vessels; for as the fluid passes through the capillaries to the veins, all the air and blood-clots will be screened out. The radial and ulnar arteries are the usual ones selected for such operation. Should the burn become infected, and the surface is an extensive one, the suppurative stage will call for a rich diet of beef, eggs, and wine, etc. In the early stage you want stimulation for a few days to tide the patient over the shock, then a light diet for some time. When suppuration is established, give a generous diet, and from that time on the injury should be treated after the same principles you would employ in the treatment of wounds in general. The method of treating ordinary wounds is too well understood to require elaboration here.

We will dress the case before us by applying iodoformized oil, gauze, and cotton, the whole to be held in place by an adequate bandage.

TREATMENT OF THE SUPPURATIVE STAGE OF TUBERCULAR OSTEITIS OF THE HIP-JOINT.

CLINICAL LECTURE DELIVERED AT THE EMERGENCY HOSPITAL, WASHINGTON, D.C.

BY A. R. SHANDS, M.D.,

Professor of Orthopaedic Surgery in the Medical Department of the Columbian University, Washington, D C.

GENTLEMEN,—The case I present to you this afternoon possesses so many points of interest illustrative of the suppurative stage of hip-disease that I shall claim a sufficient amount of your time to give you the history of the case somewhat in detail, for I feel fully assured that you will be repaid, as it will serve well to impress upon your minds the didactic lecture that I so recently gave you at the college on this subject. Hip-disease is a subject of great importance, and all of the time that we can give to its study will be well spent in preparing you for this line of work in the profession that you have chosen.

We should consider ourselves particularly fortunate to have such a case just at this time in our course, for it presents many clinical features that we do not often see except in these neglected cases that we come across in the lower walks of life.

This patient is fifteen years old, and comes from a tubercular parentage; her history as to her present trouble dates back about eighteen months. This girl was first seen by me about one year ago in the children's service of this hospital, at which time the mother related that about six months previously she noticed the child was a little lame, especially so, early in the morning; later in the day the lameness would wear off and the child could get about with comfort. This state of things went on from bad to worse until locomotion unsupported was impossible. I wish to call your attention especially to the pain and lameness being intermittent. This is a most important diagnostic sign in the early stage of hip-disease. The mother gave the usual history of pain in the child's knee, night-cries, etc.

I could get no history of any treatment of the case before she came to the dispensary.

About February 1, 1895, she was taken into the hospital. Upon admission her hip was extremely acute and painful; there was marked induration of all of the soft parts about the hips, especially the posterior aspect, causing obliteration of the gluteal folds; in fact, obliteration of all of the normal depressions about the hip-joint. The reflex muscular spasm was so exaggerated that the limb was held perfectly rigid in about fifteen or twenty degrees of adduction, and the least attempt at passive motion would produce extreme pain. This reflex muscular spasm, you will remember I told you, is nature's effort to produce immobilization of the joint and thereby relieve the pain. In this respect you see how plainly nature indicates to you the course of treatment you should adopt to relieve your patient of the pain that is such a prominent feature of this stage of these joint troubles. At that time the pain and spasm could be overcome by gentle traction, and in this way the adduction deformity could be corrected. There was no sign of an abscess at that time, but the general condition of the patient was poor.

The day after admission to the hospital the patient was anæsthetized, the adduction deformity corrected by gentle manual force, and the limb put up in a plaster-of-Paris spica, which was allowed to remain on for four weeks; on removal of the same the reflex muscular spasm had subsided and there was present a fair amount of passive motion without pain.

I will repeat what I have already said about immobilization of an acute hip by means of plaster-of-Paris spica, that when properly applied, I consider it by far the most perfect means of immobilizing the hip-joint, and in doing this you aid nature in her efforts to bring about a cure, for it puts the irritated muscles at rest and the reflexes to sleep.

As to the technique of applying the spica, I will show you presently in this case. Care should be taken that the spica should be made strong and extend from the lower border of the axillæ to the tips of the toes; two assistants are necessary to keep up counter-traction until the plaster is well set. If the dressings are snugly applied around all of the bony prominences,—the processes of the ilium, condyles of femur, malleoli, and foot,—you will obtain absolute fixation of all of the joints of the limb. The spica should be reinforced

by incorporating tight steel bars in the plaster, having one bar to extend the whole length of the spica on the outer side, and a shorter one in front from the floating ribs to the knee.

In thus treating these acute hip cases great care should always be taken not to use much force at the first sitting. If all of the deformity cannot be overcome with gentle traction, then put the limb up in its somewhat improved position, allowing it to remain in the spica for about two weeks; when it is then removed the chances are that the spasm will have sufficiently subsided to allow the deformity to be entirely overcome; then another spica should be applied and allowed to remain on until you are ready to apply an ambulatory brace.

There is in the minds of some a fear that thus immobilizing a joint will produce a certain amount of ankylosis. I beg of you to discard any such idea from your minds if it exists. Ankylosis is produced by the products of inflammation, and not by fixation; therefore anything that will tend to check the inflammation will limit the ankylosis.

A few words in favor of the plaster spica over other methods of treating these acute hips. The plaster spica has a great advantage over weight and pulley in that the patient can be made by this means perfectly comfortable, and can be moved about without jar or pain; can be conveniently taken out of doors on a rolling-chair,—a kind of ambulatory bed. Weight and pulley have to be removed whenever the child is taken from bed; then the spasm at once returns in full force, and there is a shriek of pain. The plaster spica has advantage over the various posterior splints in that it never slips from its original position and does not require constant care to keep it in order.

This patient was treated with an iron mixture; also put on cod-liver oil and guaiacol emulsion, two teaspoonfuls *t.i.d.* Under this treatment the patient's general condition improved wonderfully. At the end of the fifth week she was sent home and instructed to report at the end dispensary once a week. I kept track of her for about two months, during which time she improved so much that the mother evidently came to the conclusion that she was cured, so stopped bringing her to the dispensary. Last week, when she appeared at the dispensary, was the first time I had seen her for nine months.

In defence of her present condition, I must say that I endeavored to urge on the mother the importance of the child having the proper mechanical treatment to prevent just the condition of affairs in which we now find her.

Present Condition.—General condition poor; patient totally unable to bear any weight on left limb; standing presents four inches of apparent shortening, but upon careful measurement we find less than three-fourths of an inch of real shortening; very marked atrophy of the limb. Measurements show that the limb rests in thirty degrees of adduction and admits of no motion, either voluntary or passive. When she is under ether we will be able to tell whether this ankylosis is due to muscular spasm or to fibrous adhesions in the joint. The joint is very acute, and the least attempt at passive motion will throw the joint into a state of clonic spasm causing great pain.

You will observe that the normal contour of the hip is entirely obliterated; also you will notice that there is a prominent swelling on the external aspect of the hip below the trochanter major. This swelling is an abscess, the result of a rupture of an intracapsular collection of pus into the periarticular structure. This pus found its way into the capsule of the joint as a result of the osteitis having extended from the cancellous structure of the head of the femur through the periosteum. The capsule distended to its limit as the pus accumulated, and then ruptured near its insertion at the trochanter; the pus then followed the course of the muscles inserted about that bony prominence, and has now come to the under surface of the skin several inches lower, and if it is not now properly cared for will soon find an external opening through the skin by spontaneous rupture.

The question of what is to be done with this large abscess and this adduction deformity now presents itself. After these two complications are attended to, then what is best to be done with the limb? The course to be pursued is very plain. The abscess will be evacuated by aspiration if the pus is not too thick and cheesy to flow through the aspirator needle; otherwise I propose to let it alone until its presence causes some systemic disturbance; anything else I consider meddlesome surgery. It is a great mistake to think that every abscess should be evacuated by open incision. I never consider it necessary unless it produces some systemic disturbance; they often

remain dormant for months or years, and finally may be absorbed and eliminated and the patient get well. On the other hand, if you incise it, the best that you can hope for is to have for months and months an open wound, which will have to be dressed daily, and, even with the greatest antiseptic precautions, there will be great risk of the wound becoming infected and producing a septic temperature, which will continue just as long as the wound is open. With a constant septic temperature there is always danger of amyloid changes in some of the viscera.

As to the adduction deformity, in this case I propose to correct it by gentle manual force after the patient is etherized; this can be done easily if the deformity is due to spasm alone, but if it is due to contraction of the adductor tendons then I will do a subcutaneous tenotomy of those tendons. After this is done, I propose to encase the limb in a plaster-of-Paris spica in the best position obtainable by gentle force. I will then leave this limb in plaster until the spasm is sufficiently overcome to admit of the application of a long traction brace. After aspirating these abscesses I always strap them with straps of adhesive plaster, after the manner of strapping a sprained ankle; over this I apply a snugly fitting roller bandage, so as to produce a gentle pressure: this will protect the skin from spontaneous rupture and add very much to the comfort of the patient. The aspiration should be repeated just as long as indicated. In repeating the aspiration never insert the needle at the same place, for in this way you will soon destroy the integrity of the skin to such an extent that a spontaneous rupture will occur in spite of all of your precautions to prevent it.

A great deal has been said about irrigating these abscess sacs with all sorts of antiseptic solutions, but it has not been my good fortune to see any advantage follow this method of treatment over the "let-alone" treatment. Antiseptic emulsions are still advocated by many surgeons, especially an emulsion of iodoform and oil, but upon the whole they are not being used as much as they were a few years ago. Statistics fail to show any advantages gained by these emulsions.

For my part I am fully convinced that the progress of a tubercular osteitis cannot be at all improved or cut short by using any local treatment to the abscess sac, which is nothing more nor less than a reservoir for the pus that is being generated by the pro-

cess of osteitis that is too far distant from the abscess sac to be reached by any emulsion. If it were possible to inject the emulsion into the carious bone, the seat of the trouble, then I would expect good results, but I cannot think it possible for it to be of benefit to simply inject it into the sac which is often many inches from the seat of the osteitis. I have seen excellent results follow the use of iodoform and oil in purulent arthritis of joints where the inflammatory process was confined to the soft parts. In other words, antiseptic injections are indicated in chronic purulent tubercular synovitis.

Any deformity that may be present in an acute case of hip-disease should be corrected at once, provided it can be done without using much force, but never, never use much force. If you cannot correct all of the deformity at the first sitting, then put the limb up in a plaster spica in the best position you can gain with gentle force, allow it to so remain for about two weeks, at which time remove the spica, and the chances are that the reflex muscular spasm will have subsided from the absolute rest to such an extent that you can then gain something more; repeat the former procedure and so on, from time to time, and in the majority of cases within a few months you will have corrected all the deformity. Then you must adopt such mechanical measures as are necessary to prevent a recurrence; there is always a tendency to a recurrence just as long as any muscular spasm remains.

If by these measures you cannot correct the deformity in the early stage of the disease, you may be sure that the reparative process has begun and there is a fibrous adhesion in the joint; when this is the case, anything like *brisement forcé* should be scrupulously avoided; by breaking up these fibrous adhesions you open up a new field of invasion for the germ that is causing the trouble. The results obtained from femoral osteotomies in these cases after all the acute symptoms have disappeared are so very excellent that one is not justified in taking any risk of increasing the inflammation in the early stage. On the contrary, do everything to hasten a cure, whether it be with a stiff joint or not; at the same time use every reasonable means to prevent ankylosis, but just as soon as you see that it is inevitable, then use the best means to have the joint get well with the limb in the best possible position for locomotion.

TREATMENT OF ACUTE LARYNGITIS IN CHILDREN.

CLINICAL LECTURE DELIVERED AT THE TROUSSEAU HOSPITAL, PARIS.

BY G. VARIOT, M.D.,

Physician to the Children's Hospital, Paris

Gentlemen,—This is a disorder that you will constantly meet in your practice and that you must know well how to treat. The condition of the little patients will often appear to be quite alarming and the parents will be very anxious, so that your diagnosis must not waver and your treatment must be efficacious.

In the simple, uncomplicated forms of acute laryngitis the best remedy is steam inhalation, which can be given by means of an inhaler or by a variety of substitutes that you can invent when no apparatus is to be had. A mustard foot-bath should also be advised, and the throat should be painted with iodine and wrapped in cotton. If cough is incessant, and particularly if it prevents sleep, one of the most successful remedies is the syrup of codeine, which should be given in small and repeated doses, according to age, until the desired result is accomplished. In more intense cases frequent applications to the front of the throat of a sponge dipped in hot water should be made; or a mustard leaf may be used for the same purpose.

These are the means to be used for simple cases. But when, in addition to the inflammatory condition, the spasmodic element is present, a more methodical treatment is necessary. The combination of the two elements, inflammation and spasm, in a case of acute laryngitis in a child can be successfully treated only by putting the child in a spacious room, warmed, with the air charged with steam. The room must not be overheated, a temperature of from 15° to 18° C. (59° to 65° F.) being sufficient, and the air must be renewed at regular intervals, at least two or three times a day. During hot weather this ventilation can be insured by keeping a window slightly

open. Steam has a direct action on both the elements of the disorder, but some writers claim that it is more efficacious when some volatile disinfectant is added to the water as it boils. The following method has been advised by Goodhart:

℞ Creosote, 4 grammes (ʒi);
Powdered gum arabic, 8 grammes (ʒii).

Make a paste, add sixty grammes (two fluidounces) of a one-in-twenty carbolic solution, and put the whole in a kettle holding half a litre (a little less than a pint). The vapor given off is not disagreeable, and has neither the odor of creosote nor that of carbolic acid.

A useful and very agreeable vapor is made by boiling a teaspoonful of spirit of turpentine in two litres (or a quart) of water; but the turpentine volatilizes very rapidly and will have to be frequently replaced. The compound tincture of benzoin is also an old and well-tried preparation for this purpose.

The truth of the matter seems to me to be that, after all, in all these various preparations it is the steam that acts, and you will find that you may cure many and many a case of spasmodic laryngitis with steam and nothing else. One of the most efficacious ways of stopping the suffocation at the beginning of such a case is to hold a sponge dipped in boiling water before the patient's nose and mouth.

Some writers advise the simple steam spraying apparatus. This is also excellent, but it has a drawback in that it is apt to wet the child considerably unless you pay close attention, and the patient may catch cold. I think that of all these methods the best and most practical one is slowly to supersaturate with steam the atmosphere by which the child is surrounded. I have quite given up adding any remedies to the water that is to boil, and especially carbolic acid. The saturated air alone, as it enters the larynx and air-passages, is often enough to control and even to put a stop to the phreno-glottic spasm. This it does, in all probability, by loosening the mucus and facilitating its expulsion. It has seemed to me that in children who have a hoarse cough but normal voice, with no false membranes on their vocal cords, the often very violent spasm is kept up by the accumulation of mucus in the hypoglottic region, and that this accumulation is enough to cause the constrictor muscles of the glottis to contract. Physiological experiments have proved that stimulation of the mucous membrane of the hypoglottic region similar to that

caused by the presence of mucus may go so far as to bring on tetanic occlusion of the orifice.

It is also allowable to explain the favorable effect of a saturated atmosphere by admitting that its incessant contact with the mucous membrane of the larynx and its nervous terminations modifies the spasmodic reflex. The rapidity with which, as a general thing, the difficulty in breathing ceases when children are placed in a vapor-room in hospitals is a proof of this, and this method is a good means of differential diagnosis between true and false croup.

Speaking of vapor-rooms brings me to the question of the different methods in use in hospitals and with private patients for accomplishing this supersaturation of the air of a room with steam. In our hospitals a child with spasmodic laryngitis is on arrival placed in a large room capable of accommodating from four to six children. Large windows give an abundance of light, and the temperature is from 12° to 15° C. (54° to 59° F.). In one of the walls, at about the height of the beds, is the opening of a pipe which admits a steady supply of steam generated by an apparatus on the other side of the wall; in this way the boiler does not raise the temperature of the room by its heat, which, with the steam, would soon make the place uninhabitable.

This is what is commonly called a vapor-room. It, as well as the vapor-tent, to which I shall presently refer, has been used for a long time by English practitioners. Of course such an elaborate arrangement is not indispensable; the idea can be applied much more simply, and an open, flat receptacle, kept going night and day, may replace the hospital system. The drawbacks and even risks of this primitive arrangement, however, are that the receptacle containing the boiling water may be upset over the child, and that the heat of the fire which keeps the water boiling, which is generally added to the means whereby the room is warmed under ordinary circumstances, may raise the temperature of the air higher than is desirable.

It must, however, be admitted that for the summer season the vapor-room has disadvantages that somewhat lessen its therapeutic value. When, on our rounds in July and August, we enter a vapor-room, we experience a sensation of actual discomfort, which must be greater still for our little patients; and the question arises whether the benefit usually derived from the method is not offset by the rest-

lessness and distress it causes them at that time of the year. Under such circumstances the use of the direct steam spraying apparatus is of real service, and it is to this method that I give the preference during the heated season.

In private practice the best way of supersaturating the air which the little patient is to breathe is to set up a special arrangement called a vapor-tent. The child's crib should be surrounded and almost enclosed by a curtain or sheet, and by its side should be placed an apparatus for boiling water, which must be so arranged that by no possibility can it either be upset over the child or set fire to the curtain; in this way the steam accumulates little by little inside the curtain and saturates the air to be breathed by the child. The patient must not be too tightly shut up in the vapor-tent, as in that case the breathing instead of being relieved will become more labored; as complete a system of ventilation of the tent as can be arranged should be put into effect.

Now that we have gone into the question of the treatment by steam and of the various ways by which it can be applied, let us turn to the different sedative remedies of the nervous system that may be used for lessening the phreno-glottic spasm. Between the attacks you can give with a fair chance of benefit a teaspoonful of the following, three times a day:

℞ Bromide of potassium, 1 gramme (gr. xv);
Syrup of ether,
Syrup of orange-flowers,
Distilled water, āā 20 grammes (℥v).

Or else of the following:

℞ Musk, 10 centigrammes (gr. iss);
Bromide of potassium, 1 gramme (gr. xv);
Syrup of orange-flowers,
Distilled water, āā 20 grammes (℥v).

In the evening a suppository may be inserted containing:

℞ Extract of belladonna, 5 centigrammes (gr. ¾);
Solidified glycerin, 2 grammes (℥ss),

or five drops of the following can be given night and morning:

℞ Tincture of fresh aconite root,
Tincture of belladonna, āā 5 grammes (gr. lxxv),

increasing one drop a day up to twenty drops.

Local applications to the front of the neck have been recommended by some writers; for instance:

℞ Mercurial ointment,
Lard, āā 15 grammes (℥iii gr. xlv),

and each day a tepid bath may be given, in which should be put:

℞ Extract of belladonna, 1 gramme (gr. xv);
Lime-flowers, 50 grammes (℥iss);
Boiling water, 1 litre (Oi).

After the bath the child should be put to bed again and have its legs wrapped up in wool. Finally, for general effects, children that have reached a certain age should take tonics,—syrup of iodide of iron, iodo-tannic syrup, or cod-liver oil. If the child is suffering at the same time from rickets or craniotabes, these conditions must be treated by the usual means; and if there seems to be good reason for suspecting teething as being the cause of the disorder, though this is rare, you will be authorized in lancing the gums at the points where the teeth are coming through.

This may seem a long list of means, and of varied application, to quiet the phreno-glottic spasm; but the fact is that at the present time we have not a single one on which we can really rely, and this is a highly regrettable lacuna in our pharmacopœia. I need hardly remark that if we were in possession of such a remedy many surgical operations could be avoided. We have made in these wards two attempts to put our hands on something of this order, but so far I cannot say that we have succeeded very brilliantly. We began by giving to our little patients in the vapor-room a mixture of bromide of potassium and tincture of valerian, one gramme (fifteen grains) of each per tablespoonful of solution; but as the results, after a test of several months, appeared to be quite uncertain, we turned our attention to codeine.

This alkaloid, extracted from the opium plant, is well tolerated in doses of one centigramme (one-sixth grain) each twenty-four hours below one year of age. Two centigrammes (one-third grain) may be given at the age of three and over. The solution we used contained one centigramme (one-sixth grain) per tablespoonful of solution, or one-third of a centigramme (one-eighteenth grain) per teaspoonful.

One teaspoonful should be the first dose, which may be repeated in an hour if the child is not then asleep. The dose necessary to produce sleep varies from one child to the next, and the effect sometimes lasts more than twenty-four hours; some children are found heavy and sleepy in the morning from the effects of the codeine taken the previous evening. We gave the remedy in more than one hundred cases, without any accident occurring that might point to any contraindication to the drug. During the sleep produced by codeine the labored breathing usually decreases and the respiration is slow and regular. In many cases a mild phreno-glottic spasm may seem to have yielded, but when it is intense it continues. A singular fact is that the "roaring" corresponding to a combined spasmodic condition of the glottis and diaphragm goes on in spite of the children being sound asleep; under these circumstances sleep produced by codeine does not produce cessation of the spasmodic contraction.

However this may be, until further notice I look on codeine as an efficacious remedy in light and medium cases of phreno-glottic spasm; and, since it appears to be harmless, I advise its use in order to postpone or even avoid surgical intervention.

When all medical means have failed, when the child is worn out by labored breathing with an occasional attack of suffocation interspersed, when cyanosis of the face shows that asphyxia is beginning, and when the pulse denotes disordered circulation and heart weakening, the surgical resources, intubation and tracheotomy, become necessary. In hospital wards, in the presence of a serious case of spasmodic laryngitis or false croup that requires surgical treatment, intubation should be preferred to tracheotomy whenever possible. It may appear to you strange that to overcome suffocation produced by non-diphtheritic, spasmodic laryngitis there can be any hesitation between intubation and tracheotomy; but you will see presently that such non-diphtheritic cases in connection with measles require tracheotomy more frequently than intubation, which has been found to be an inferior operation in such instances. My personal experience has been that in hospital work and for serious cases of acute spasmodic laryngitis, intubation, performed in a manner somewhat different from that employed in cases of diphtheria, gives pretty favorable results. I shall refer in a moment to the method of prolonged intubation, which seems to me to be the only one of use in serious cases of spasmodic croup; in our wards it can be readily used,

but in private practice it should not be resorted to without mature consideration.

Intubation, which, during serious cases of acute laryngitis as well as in diphtheritic croup, may be complicated with sudden and absolutely unforeseen accidents, requires constant and assiduous watching. When, therefore, such an operation is done in private practice, the patient must be placed in circumstances absolutely similar to those existing at hospitals; in other words, the patient must be attended day and night by an experienced physician or interne, who, if the tube should come out or become obstructed, will know how to act quickly and properly. This is equivalent to saying that the method can be applied only in families of means; but, even when this precaution has been taken, to leave a patient in the entire charge of a single person may not be satisfactory.

You have only to recall some of those cases where, from unexpected and inexplicable reasons, intubation is so difficult that even experienced operators fail to get the tube into place. In some cases in hospital practice one man will succeed where another one, equally skilful, has just failed. In difficult cases two operators are not too many; this is a simple matter to arrange in hospital wards, but in private practice parents do not always see the necessity of having two persons in constant attendance on their child. As for country practice, the constant watching required by such patients is out of the question, and you will have to do tracheotomy at once.

If we lay so much stress on the various difficulties that may arise, it is because cases in which the treatment requires great skill are not at all unusual. In certain serious cases of acute laryngitis the intensity of the spasmodic symptoms is so great that the tube has to be kept in the larynx for even a longer time than for membranous croup.

I wish, therefore, to lay special stress on this fact that temporary intubation, or temporary dilatation of the glottis, consisting simply in inserting the tube and then withdrawing it, has seemed to me to produce lasting relief less frequently in stridulous than in diphtheritic laryngitis. You are probably aware that the mere clearing away of the membranes, in the latter case, by temporary insertion of a tube may put an end to the spasmodic symptoms.

It is quite exceptional to get such a result in serious cases of false croup, and in a little epidemic of this complaint that we recently

had in our wards temporary dilatation of the glottis did not help us out; it is only fair to say, however, that at that moment we had discontinued the use of codeine as an adjuvant to the treatment. Consequently we have to regulate our intervention according to the intensity and length of the spasm. These acute, non-diphtheritic, suffocating cases of laryngitis have to be treated by prolonged dilatation of the glottis with an O'Dwyer canula, which is left in place as long as may be necessary. When quiet sets in, and lasts from twelve to twenty-four hours, the tube can be removed to feed the child or clean the instrument. It should then be replaced, if necessary. In the spasmodic laryngitis of measles the spasm is sometimes so intense that dilatation of the glottis by means of the canula is said to give uncertain results, and to prevent suffocation tracheotomy is often necessary. The spasm in measles is kept up by ulcerations of the larynx due to the infectious agent of the disease; and, since intubation seems to make these ulcerations worse, it is not surprising that in order to overcome the spasm we should be obliged to open the trachea.

THE PRESENT STATE OF THE TREATMENT OF TABES.

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The change which, especially under the influence of the prevalent doctrine of neurons, is rapidly beginning to make itself felt in our views regarding the pathology and pathogenesis of tabes, is such as to induce us to subject our existing store of therapeutic means and measure against this wide-spread disease to thorough revision and criticism in the light of the clinical experience that has been so abundantly collected. If I take the liberty of calling attention to some suggestions in this direction, I am perhaps justified in doing so by the circumstance that I have for many years endeavored to maintain, both in speaking and in writing, a practical and empirical stand-point specially subservient to therapeutic demands and necessities. An experience of over thirty years in the treatment of tabes enables me perhaps to judge fairly of several disputed questions connected with it, without theoretical partiality and prepossession.

What a surprising change has taken place before our eyes in the opinions and fashions regarding the treatment of tabes, as in almost all other departments of therapeutics, during these thirty years! I myself, a pupil of Romberg, have lived through the times when people clung too slavishly to that old master's exclamatory dictum: "On none of these unfortunates will the light of recovery shine! Sentence of death has been pronounced upon them all!"—or, as Steinthal, who died very old only a few years ago, and who was one of the first to give a somewhat accurate description of the clinical aspect of tabes dorsalis, laconically expressed himself at the end of his dissertation in 1844: "Tabei dorsalis therapia nulla." At that time even the mere announcement of a lecture on the treatment of tabes must have seemed cruel irony. This circumstance alone clearly indicates the progress that has been made since then. But, as, fortunately, therapeutics never can be destined to remain perma-

nently at the stand-point of pure negation, people gradually began to indulge in all manner of daring ventures into this apparently lost province of medical science, some of which, it must be confessed, were far from successful. First they tried the "derivative" or "revulsive" methods, which then acquired so high a reputation. I myself have seen with a shudder how with the cautery-iron they burnt long stripes down the backs of tabes patients, a method which even highly enlightened physicians at that time did not disdain, but which, nevertheless, had, in all probability, hardly any other effect than to compel the sufferers to lie in bed, often for many weeks.

In the beginning of the sixties came the time when, trusting to the very sanguine recommendations of Wunderlich, Charcot, Vulpian, and others, people expected miracles of nitrate of silver; then Robert Remak's enthusiastic extollings of the constant current for tabes dorsalis, the diagnosis of which still rested on somewhat uncertain foundations. Later on balneotherapeutics (represented especially by thermal brine-baths and carbonated thermal brine-baths) and hydrotherapeutics advanced their well-founded claims. The times of bloody and bloodless nerve-stretching, of the mechanico-orthopædic methods of Motschutkowsky, Bonuzzi-Benedikt, Weiss, and recently of Gilles de la Tourette and Chipault, followed. There came also the antiluetic treatment, based on a partly incorrect hypothesis or incorrect generalization, and falsely called a "causal" method; there came psychotherapeutics and organotherapeutics; and finally the movement-therapeutics, for which Fränkel's investigations have gained general attention and recognition,—the "compensatory" exercise-therapeutics of the ataxic. If, finally, we add the numerous pharmaceutical palliatives mostly against individual painful or dangerous symptoms, the narcotics and antineuralgics, morphine and strychnine, antipyrine, phenacetine, and the innumerable kindred preparations, it looks as if we had at our disposal a magnificent arsenal of remedies and treatments, which, however, on closer inspection in a case of disease, shrink into a smaller compass.

The conditions of a comparatively successful treatment of tabes cannot, as I have always and on the most different occasions declared, in absolute accordance with our modern conception of disease—cannot, I say, be regulated according to any fixed general scheme; on the contrary, they demand absolutely individualizing appreciation and judgment in each particular case. The prognosis, which, as is

well known, is generally so unfavorable, is subject to very considerable fluctuations and modifications, according to the whole nature and course of the individual case, according to the existing constitutional and etiological factors, the extent, severity, and gravity of the morbid symptoms, complications, etc. Quite apart from the now swifter, now slower, interrupted or steady progress, cessations lasting for years, and even forever in comparatively early stages of the disease, may occur; also considerable improvements, even occasional "cures" worthy of the name—understanding the word "cure," of course, only in the sense of functional, not of pathologico-anatomical restitution—never, indeed, I believe, without a remnant of at least some more or less noticeable residual phenomena, functional scars and stigmata. These, however, are by no means necessarily incompatible with great general working power, and a more or less complete ability on the patient's part to perform the duties of his calling and to earn his living. Whether, under such circumstances, one prefers to speak of "comparative" cures or only of far-reaching and lasting improvements seems to me, on the whole, rather a question of words than a practical matter. The only point of importance is that one does find, among a great number of tabes cases, a very few that take the favorable course which I have described. They may also be found, in conditions otherwise favorable,—and this deserves very special mention,—under the most various methods of treatment, methods for the most part hardly appraisable as regards their value and rationality, still less mutually comparable. A few "cures" have taken place in cases which were treated by the method, at bottom so irrational, of administering silver pills (I myself have observed and described such a case); several cures have been observed among cases treated by galvanization and faradic brushing, by thermal baths, hydrotherapeutics, and Chapman's back-hose; several cures have been observed with and without the much-boasted antiluetic (mercurial) treatment, and quite lately one even in a case that was treated with Pöhl's spermin. It seems necessary to interpret these well-attested facts by supposing, not that the methods I have named possess a quite special and specific value against tabes,—though I am far from absolutely disputing their curative importance,—but that there are some cases of tabes of such a nature that the disease advances to a certain degree of injury to health, of functional impairment, and then, permanently or at least for a very long time,

stops, or even, so far as the functional disturbances in question are concerned, retrogrades. How that happens and can happen is another question, which cannot yet be so completely surveyed and answered; for the answering of which, however, our latest therapeutic acquisition, the exercise-therapeutics of the ataxic, of which I have still to speak, offers some hints well worthy of attention.

Let us now cast a rapid critical glance at the several remedies and methods which I have named. From the application of derivatives and revulsives hardly anybody nowadays, I suppose, will expect any considerable advantage; and the same may be said of nitrate of silver, the usual internal administration of which, moreover, in the form of pills, has long been proved to be rather inexpedient and disadvantageous, and ought to be supplanted by the subcutaneous injection of the preparations of silver (carefully tested by me) suitable for this purpose, especially the freshly prepared solutions of albuminate and hyposulphite. Of the principal methods of electrotherapeutics, balneotherapeutics in the narrower sense (thermotherapeutics), and hydrotherapeutics, which must still be taken into consideration, though with somewhat diminished enthusiasm, we may say quite generally that their useful effects have been empirically proved in a great number of tabes cases as conclusively as anything in the therapeutic province can be proved at all, but that no key whatever has been found to a rational explanation or an adequate understanding of these effects. This being so, it would be of no use to indulge in consequential conjectures whether galvanic or faradic therapeutics, whether the former in the form of "rising" and "falling" spinal-cord currents, of stable and labile spinal-cord-radix currents, as "galvanization at the sympathetic nerve" and "diagonal galvanization through the spinal cord by stages," or in any other way, deserve preference; and whether natural baths of chemically indifferent water, acting chiefly through their high temperature, simple or carbonated brine baths, or sulphur baths, sulphuric mud baths, etc., are more likely to avail. I wish only to remark by the way that, if the majority of tabes patients still, as formerly, flock in great numbers to certain watering-places to which fashion has given eminence, this circumstance, which depends on quite other factors, does, in my opinion at least, by no means justify the conclusion that these places have quite special and specific merits in the treatment of tabes, as compared with many others. For the rest, the artificial

carbonated baths (Quaglio's, for instance), which are now quite admirably prepared and can easily be used in the patients' homes, may in many cases, especially when the patients are not well off, be advantageously substituted for visits to watering-places. The local application of heat and cold to the vertebral column, which can be effected by Chapman's so-called back-hose and similar apparatus, is also of undeniable, at least palliative, effect in many cases, though of its effects, too, no rational understanding has yet been achieved.

The question of the value of the antiluetic treatment is extremely difficult to judge of, despite, or perhaps also just because of, the almost boundless material bearing upon it that has been collected during the last twenty years. The difficulties lie mainly in the still unsolved preliminary etiological questions regarding the relation of tabes to syphilis, as to which, as is well known, there still prevails, especially in Germany, the most diametrical difference of opinion: I need only mention von Leyden on the one hand and Erb on the other. It would be difficult to exhaust this question, and I shall not lay it before you in all its bearings, but I should like to indicate my own stand-point, and the therapeutic consequences resulting from it, in a few words. On the one hand, I regard it as proved to a certainty, and as a thing which, according to my own personal experience, does not admit of the least doubt, that by far the preponderant percentage of tabes patients have been previously infected with syphilis. Twelve years ago, in an article that appeared in Virchow's *Archiv*, I stated this percentage, in accordance with my experience at that time, at thirty-nine, but I am now convinced that, as the investigations become more and more exact, the percentage (which, as my casuistic material is not definitively collated yet, I cannot now fix) will be found to be considerably higher. I, therefore, readily admit that a person who has never been syphilitically infected has only a comparatively slight, but still some, chance of getting tabes. On the other hand, there can be no doubt that cases of tabes occur, though by no means frequently, in persons whom not even the most exact inquiry and investigation can show to have any syphilitic antecedents whatever, and in whom hereditary syphilis, too, which is wont to be adduced with predilection supplementarily, proves equally undemonstrable,—especially when tabes begins in the thirties or forties,—that is, comparatively late in life. This fact alone, quite apart from all other objections, signally proves that we

are not at liberty to regard syphilis as the sole and essential cause of tabes, and to regard tabes (as Moebius, among others, has lately done) as simply a sequela of syphilis,—*metasyphilis* or "metasyphilitic atrophy of the nerves" (primary atrophy of nervous parts of which syphilis is the *conditio sine quâ non*). The ascription of tabes to specifically syphilitic toxines is open to the same objection, for tabes occurs in persons who have never had syphilis, not to mention the fact that nothing whatever is known of such toxines.

It is, therefore, pretty well out of the question to speak of antiluetic therapy as a treatment of tabes dorsalis really deserving to be called "causal." The only remaining interpretation, then, is that which I advocated in my former essay,—namely, that syphilis acts as a weakening, depotentiating factor, diminishing the energy of the nervous system and its power of resistance, and thus in a high degree predisposing to the disease, but cannot be regarded as its real direct cause. Syphilis, therefore, must be classed with the other, similarly effective, etiological factors, of which, besides heredity and constitutional taint, I may name especially injurious atmospheric influences (colds, drenchings), bodily over-exertions and hardships, depressing emotions, wounds, habits of excess, and in general the factor of functional exhaustion by over-excitement, which has recently been placed in the foreground by Rosenbach and Edinger.

This view, which disputes the direct causal relation of syphilis to tabes, is essentially supported and confirmed, in my opinion, by the results of practical therapeutic observations. The results of the specific treatment, which has been applied everywhere many thousands of times so energetically and perseveringly, have, on the whole, by no means justified the expectations that were cherished, and have but seldom gone beyond temporary and palliative improvements, such as are often to be obtained by other means also. In estimating these successes, moreover, the other simultaneously effective factors —regulation of the manner of living and diet, rest, the use of baths and other therapeutic aids—must not be left out of account.

But, taking all this into account, "cures" under antiluetic treatment are quite rare, hardly more numerous in proportion than under other treatments, while, as a rule, the result in advanced cases of tabes is wont to be restricted to the mitigation of individual symptoms, and even in fresh cases to more or less partial improvement and immobilization of the process for a length of time, that is to say,

to palliative successes such as have been obtained without "specific" treatment under the most various therapeutic measures frequently enough, probably at least as frequently in proportion.

In the light of my own experience I regard it as certain that cases of tabes with unquestionably luetic antecedents can, under certain circumstances, be mitigated, and even "cured" now and then, both with and without specific antiluetic treatment, while in the majority of cases the "specific" treatment is quite, or almost quite, unsuccessful. On the other hand, it must not be forgotten that the thoughtless use (or abuse) of the antiluetic method, especially the liberal and extensive application of inunction, may under certain circumstances do, and has actually done, a great deal of harm. This is not a fit occasion for going into the details; but I wish at least to point out that especially the cases with progressive atrophy of the optic nerve, and those complicated by general debility of the organs of nutrition, muscular atrophy, trophic ailments of the bones and joints, etc., offer specially unfavorable chances to mercurial therapy, and often visibly and rapidly grow worse under it.

As regards the pharmaceutic remedies that may be used against tabes, I can say what I have to say very briefly, because their mode of operation is generally known, and their application quite limited, though, indeed, within their limits almost indispensable. This is especially true of some narcotics and the remedies belonging to the group of the so-called antineuralgics. Morphine, especially in subcutaneous injections, we shall hardly be able to replace by anything else in severe "gastric" and other "visceral" crises, and we must therefore keep it, even at the risk of occasionally giving a tabes patient the first impulse to morphiomania. Codeine, peronine, and similar substitutes cannot completely replace morphine in the treatment of tabes. Strychnine, which is also most advantageously administered subcutaneously, is a valuable means of bettering (only transiently, for the most part) the disturbed reflexes of the bladder and the rectum. People used to expect that it would be of great use against disturbances of sensibility and of the organs of sense, especially against progressive amblyopia caused by atrophy of the optic nerve, but experience has not confirmed these expectations. As a palliative against the lancinating pains, iodide of potassium is of very uncertain effect, and the same may be said of the whole host of "antineuralgics" that have been put forward of late, of which I

name only antipyrine, antifebrine, salipyrine, phenacetine, lactophenine, and methylene-blue as the best known and as those that have, comparatively speaking, best stood the test of experience.

Of the "organotherapeutic" preparations, which have, of course, been puffed of late as remedies for tabes—spinal-cord tabloids, medullades, and the like—Pöhl's sperminum, which has taken the place of Brown-Séquard's original injection (of extract of the testicles), may deserve most attention, not, indeed, as a specific, but as a nerve-tonic. Specially good results are said to have been obtained with it in Russia; such have been reported quite lately by the Emperor's physician-in-ordinary, von Hirsch, in a little publication on spermin, and by Werbilzky, of Popoff's clinic in St. Petersburg. I myself have for years past often used spermin subcutaneously, even in severe cases of tabes, and have often seen a decided improvement of the sensibility, of the muscular sense and muscular power, sometimes also of the function of the bladder (overcoming of retention of the urine), after its administration,—generally, however, not of long duration. These and kindred medicaments will have to be further tested before their value can be definitively estimated.

I now come to an important category, which has only lately had much attention paid to it and with good results,—that of the surgical, kinetic, and mechanico-orthopædic treatment of tabes, or, as it is often collectively but not very felicitously designated, the mechanotherapeutic method. With a discussion of operative nerve-stretching, indeed, I need hardly entertain you; it is dead, and may it never (or, as one must never say "never," you know, not soon) rise from the dead again! Whoever, like me, has lived through the palmy days of this operation, and observed its originators and propagators in their "senseless doings," will recognize the justice of this wish, and will find it difficult ever to get rid entirely of a certain distrust of all surgical offers of help in diseases of the central nervous system. Then, since 1889, and mainly on Charcot's recommendation, the suspension-method first practised by Motschutkowsky came into pretty wide vogue for a good while. It was followed by kindred methods, among which the stretching in horizontal dorsal position, recommended by Bonuzzi and Benedikt, the extension- and distraction-method (also in horizontal position, with extension-bed), celebrated by Max Weiss, and the method of forced bending of the upper part of the body forward in a sitting position with the legs stretched

and adducted, recently recommended by Gilles de la Tourette and Chipault, deserve mention. I have used the last-mentioned method almost exclusively of late, generally with quite satisfactory effect. All these methods alike aim at stretching and lengthening the spinal cord, and quite frequently actually produce not inconsiderable symptomatic ameliorations, especially as regards ataxia, lancinating pains, anæsthesia, disorders of the bladder and the genitals, for some time at least, in mild and not too far-advanced cases. More one must not expect of them. They need, moreover, very cautious and forbearing application, and must be regarded as decidedly contraindicated in old, severe, or acute cases. To them may be added the use of the supporting apparatus made by the well-known mechanician Hessing (supporting stays), of which Jürgensen is the chief medical advocate, the very uncertain effect of which is also traceable to the continued stretching of the vertebral column and perhaps of the spinal cord.

With the methods spoken of above Fränkel's method of flexion-therapy, the "compensatory exercise-therapy," has a certain affinity, inasmuch as it aims essentially at ameliorating ataxia; but it strives to attain this end in quite another way, from quite another point of view, and by quite other, I may say, physiological, auxiliary means. It is impossible to go deeply into the details of this method here, which, moreover, I discussed, in another connection, in a lecture I delivered to the Balneological Congress last year. I shall only indicate here that the task it proposes itself is, so to speak, to practise and reconquer the feelings of movement, and in general of the muscular sense, which the ataxic patient has lost (the sense of posture, of active and passive motion, of the amount of resistance to be overcome, and of the nervous activities needed), and that it completely performs this task up to a certain degree by careful, methodical, and gradual treatment. The results of the method, which I have myself used for years in a very great number of cases, are—within the limits necessarily drawn by the nature of the disease and the greater or less gravity of each individual case—to be characterized as extremely favorable. Not a few patients can in this way be enabled to keep or to recover their working power, their ability to exercise their callings, for years. For individual prognosis, as Fränkel himself points out, the state of the muscular system (diminished tension) and of the joints is of essential importance. The treatment must be strictly individual. Over-fatigue must be avoided. The use of complicated

apparatus, such as has been ingeniously devised for the upper members by Fränkel himself and for the lower by Jacob, is in the majority of cases by no means necessary; often, on the contrary, the simplest aids suffice. We have, therefore, in this method, though it may justly be called only a "symptomatic" one, an extremely valuable aid, a real therapeutic gain, the application of which, indeed, imperatively demands intelligent, methodical guidance and persevering carrying out on the physician's part. It would be frightful if it fell into the hands of medically untrained cold-water and diet doctors, quacks, and masseurs, as has, unfortunately, long been the case with so great a part of the so-called "mechanotherapy."

Permit me, in conclusion, briefly to discuss a question which seems to me of special practical importance, and which is not generally sufficiently attended to. Before one can consider how a tabes patient is to be treated, it is very often necessary to decide where the treatment can take place with the greatest advantage to the patient, —whether at home, in open health-resorts, or in hospitals, hydropathic establishments, or sanatoria. In very many cases home treatment is for good reasons out of the question, or at least disadvantageous, either because the general circumstances in the patient's home are unfavorable, or because they seem insufficient for attentive bodily care or for the hardly less important raising of the psychical condition of the patient, or because parts of the treatment cannot be properly carried out in the house. In such cases, which, as already said, are decidedly numerous, the question is an easy one when the patients are *poor:* they must be sent to a hospital. It is only to be wished, indeed, that the hospitals were more uniformly and amply furnished with the therapeutic apparatus necessary for the treatment of such patients than is generally the case, at least in this country.

To send patients of small means to a watering-place, often at the expense of great sacrifices, in order that they may spend three or four weeks there amid all manner of restrictions and without the comforts they are accustomed to,—this I believe to be of quite imaginary benefit, and most decidedly unadvisable. This applies also to the cases in which the symptoms of tabes seem to develop in connection with accidents that have occurred in industrial operations, and in which treatment at watering-places is often ordered by medical men, but never, I suppose, attended with more than quite transient success. The money necessary for this might be decidedly

better spent otherwise, and I have already referred to the advisability of giving such patients artificial carbonated baths, which can easily be prepared in hospitals, clinics, etc., instead of natural baths. In the case of patients of the better classes the question of expense is less important, and one may let them go, if they seem to expect benefit from it, to Oeynhausen and Nauheim, or to Warmbrunn and Teplitz, Aix-la-Chapelle and Meinberg. One must, however, impress upon them from the outset that the usually short duration of the bath-treatment, and the use of the baths in general, by no means suffice, but must be combined with unstinted and energetic treatment, comprising the completest possible use of all indicated and disposable means, and the regulation of the whole way of living under strict medical control. In all circumstances the treatment in well-organized establishments superintended by medical experts will be found better and surer; and especially for the later stages of the disease, requiring minute care, and for severe and complicated forms of the disease such treatment is often almost indispensable. Among the great number of so-called nerve-sanatoria, hydropathic establishments, etc., that offer their services, there are, it is true, but a very small minority that possess the proper organization, the necessary attendants, the medical superintendence, and the whole general arrangement really to fit them for the purpose in question. To find out such establishments must be the affair of the family doctor or the consultant, and they should never send a patient who is seriously ill to an establishment of this kind until they are convinced, if possible by personal inspection, that it is absolutely trustworthy.

You see that, considerable as is the progress which we have made, this field of medical science is one in which a very great deal remains to be done and to be desired, and that there are still very many unsolved problems in it, some of which it will certainly be difficult—nay, perhaps impossible—to solve completely. The difficulties, indeed, great as they are, may serve only to strengthen the impulse to zealous effort in the direction in which progress has already been made; and, as we have already achieved not a little in behalf of these unhappy patients, we may well hope, by further progress in therapeutics and in the care of the sick, which is always becoming more closely interwoven and allied with therapeutics, to make their lot still better,—more endurable even under the most aggravating circumstances.

THE TREATMENT OF UTERINE FIBROMAS.

BY A. RICARD, M.D.,

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A PHYSICIAN cannot base a line of treatment on the simple diagnosis of uterine fibroma. He must begin by ascertaining the patient's age, the method and rapidity of evolution of the tumor, and the various functional disorders caused by its presence.

The pathological anatomy of these tumors varies very extensively: some of them grow towards the abdominal cavity or into the broad ligament, while others remain buried in the substance of the uterine wall or appear as polyps in the cavity of the uterus, and each variety has symptoms of its own. It is more these symptoms that constitute the therapeutic indications than the anatomical variety. Thus, it will be not so much the submucous position of a fibroma that will induce us to intervene as the fact that it causes serious and repeated hemorrhages, and it will be less the subperitoneal position of such a growth than the fact that by its volume it causes disorders by compression.

We may divide these various fibromas into three classes: (*a*) those on which we should not operate, (*b*) those on which we may operate, and (*c*) those on which we must operate.

(*a*) Those on which we should not operate include the small fibroma that gives rise to no symptoms but is only discovered by chance in making an abdominal exploration. When such a fibroma is discovered in a young woman, its evolution should be closely followed, so that if necessary it can be taken in hand before it leads to serious trouble.

Except in cases of urgency a fibroma discovered in a woman approaching the menopause should not be touched. It is then desirable to try to gain time, as these tumors often become quite harmless, and therefore, when a patient is more than forty years of age, many

a tumor can be left alone that would have been operated on in a younger woman.

There are other cases that must not be touched because the time for intervening has passed. In old, cachectic women, in patients with very large and adherent tumors, or in cases where the general condition is very bad, it is not advisable to attempt an operation. Such action would be too serious for the patient's vital powers. The surgeon must judge of the pros and cons of such cases and decide to the best of his ability.

When no operation is possible medical treatment must be advised. Medical treatment, however, is useless if the fibroma causes no trouble. All that is then necessary is to give some hygienic directions. All causes of pelvic congestion should be avoided, lest the nutrition of the fibroma be stimulated. Excessive fatigue should be forbidden, such as horseback riding, bicycling, etc., as also overindulgence in sexual intercourse, and constipation must be guarded against. Rest in bed during menstruation should be recommended, and the patient should be told, if married, that it is very unadvisable for her to become pregnant; many such a case has ended in the loss of both mother and child.

(*b*) As regards our second class, the cases on which we *may* operate, the operative treatment is usually not considered until the medical means we have at our disposal have been tried. When a fibroma begins to make its presence felt, either by pressure, pain, or hemorrhage, the patient has to be more closely followed and directions more strictly given.

Of all internal remedies ergot is the one that is still held in highest favor. It is claimed to succeed, in a certain number of cases, not only in putting a stop to hemorrhage, but also in reducing the size of the fibroma. It is hard to say just how the ergot acts, but it seems probable that it has a maximum effect in interstitial tumors surrounded by uterine tissue hypertrophied and contractile, and in tumors rich in muscular fibres. Its action is probably inefficacious in cystic or subperitoneal fibromas.

The ergot treatment, however, is long and disagreeable. It should be given in the form of ergotine in hypodermic injections; and, in order that they should not be painful, the injections should be made deep into the muscles.

When this treatment is continued for months, it may affect the

general health and bring on signs of ergot intoxication; so that, in view of its trouble, slow character, and uncertainty, other remedies have been advanced to take its place.

Thus, the tincture of cannabis indica (from ten to thirty drops a day) and the fluid extract of hydrastis canadensis (from twenty to fifty drops a day) have been recommended, on the theory that they increase the contractile power of the uterus and lessen the nutrition of the fibroma. The tincture of viburnum prunifolium (from one hundred to one hundred and fifty drops each twenty-four hours) has also been prescribed, but its action as a sedative and hæmostatic is open to serious doubt.

Another series of remedies has been used to reduce the volume of these tumors: iodine, iodide of potassium, and bromide or chloride of calcium are supposed to produce an atheromatous condition of their arteries. Other writers have advised arsenic or phosphorus. But in reality there is no such thing as an internal treatment for the fibroma itself; there is only a symptomatic treatment for the hemorrhages and pain.

By the side of these medicinal treatments we must place a more recent method, and one more worthy of attention on account of its efficacy,—the electrical treatment of fibromas.

Without going into the passionate discussions that have taken place on this subject, I can say from my personal experience that the electrical treatment is particularly efficacious against hemorrhage and that it sometimes relieves the pain, but that I have not found it to have any action on the size of the tumors.

The action of the electric current on hemorrhage is unquestionable, and it is quite common to see this symptom cured in cases of fibroma after a treatment of this sort. It is difficult to say how electricity acts; even the specialists do not agree on that point, and their methods vary in consequence, some acting on the inner surface of the uterus with currents of high intensity and others on the vagina with currents of low intensity. Personally I have always used the former method, but the other may be equally effective, for all I know.

Pain caused by fibromas is less easily influenced by the current. I have failed in many such cases, and even when improvement manifested itself it was only for the time being.

I have never noted the lasting and true decrease in size of a

fibroma by electric treatment reported by some writers. It should not be forgotten that errors in estimating the size of a fibroma may be easily made; through modified circulation, muscular contraction, or inflammation or exudation about them, they may seem to vary in large proportions, being at one time large and soft and at another smaller and hard.

However this may be, electrolysis applied to the treatment of uterine fibroma is probably the best palliative we have. Unfortunately, many cases improve temporarily only, and have to come finally to the surgeon's hands.

Electrolysis acts best in interstitial fibromas rich in muscular fibres, but has no effect on subperitoneal tumors. It may be dangerous in cystic fibromas, or when they are inflamed, or complicated with suppurative salpingitis. The treatment, to do no harm, must be applied prudently and antiseptically. You must be sure that you are dealing with a case of pure fibroma and that there is no contra-indication, such as inflamed appendages, subperitoneal seat, cystic condition, or infectious symptoms.

But it should be understood that medical treatment of uterine fibromas is only palliative, and that it acts to a certain degree on some symptoms but not on the tumor itself. You can advise your patient to rest as much as possible, to take hot douches, wear a suitable belt, avoid constipation, and you can give her opium, antipyrine, and ergotine, but you will not check the progress of the fibroma.

The symptoms or complications that you will be called upon to treat medically are hemorrhage, pain, compression, salpingo-ovaritis, phlebitis, peritonitis, torsion of the pedicle, etc., but they can all be brought under four headings,—hemorrhage, pain, compression, and infectious symptoms.

When hemorrhage is moderate, you can be satisfied with rest in bed, hot douches, an enema with from thirty to forty-five grains of antipyrine, and plugging of the vagina or even of the uterine cavity. If the flow is more abundant, lasting, or repeated, you must not lose time, but act more energetically. If you are fitted out for the purpose, try the electric current; if not, bear in mind that the loss of blood is due to metritis, that it is the mucous membrane which is bleeding and not the fibroma, and direct your action against the infected mucous membrane by resorting to intra-uterine applications

or to curettage. With a Braun syringe and a fifty-per-cent. solution of chloride of zinc you may succeed; sterilize the syringe and carry a few drops of the preparation well into the uterus without anæsthesia, and repeat if necessary. Curettage is, however, more efficacious, and should be used if this fails.

By these various means the vascular layer of the mucous membrane is removed, and, as it is the source of the flow of blood, the latter stops; but, unfortunately, this is only temporary, and you do not get a final result. These means are, though, of great service with patients whose condition is too serious to admit of any radical means. Hypodermic injections of serum should also be employed to improve the general condition.

When the predominant symptom is pain, the patient should remain in bed, with hot and abundant vaginal or rectal douching, and laudanum per rectum; suppositories with morphine, belladonna, or from fifteen to thirty grains of antipyrine are also useful. When the pain comes on in crises, enemata of antipyrine (from thirty to forty-five grains) or chloral and hypodermic injections of morphine give valuable results. Electricity is generally of no use.

It is in cases like these, with complex attacks of pain, that the treatment at the saline mineral-water resorts, such as Salins, Salies de Bearn, Biarritz, and Kreuznach, gives unexpected results, and during the intervals between these treatments the ground gained may be maintained by artificial salt baths at home. The thermal treatment not only acts on the fibroma, but also improves the patient's general health.

But when the thermal therapy is inefficacious it should not be persisted in too long before having recourse to a surgical operation, as the latter will have more chance of success if the patient comes to the surgeon's hands in good general health, and not worn out and reduced in condition by suffering and drugs.

When the tumor causes disorders by pressing on the surrounding organs, the patient should be kept in bed; the use of laxatives and hot vaginal and rectal irrigation will, by lessening congestion in the fibromatous mass, reduce to a certain degree the pressure due to the tumor. But it will not be difficult to understand that the limits of these means are very restricted. In a certain class of cases bimanual intervention, with or without chloroform, by rectifying the position of the tumor, will put a stop to compression of the rectum or bladder.

By varying the position of the patient in bed some relief may also be obtained. But, as a general thing, whenever a fibroma is accompanied by signs of abdominal compression, either of the bladder, rectum, ureters, intestines, veins, or nerves, this constitutes an indication for early operative intervention.

(*c*) As regards our third class of cases, on which the surgeon *must* operate, the indications for operating are of various sorts. When in a young woman the volume of the fibroma increases rapidly, or when by its volume or weight it fills up the abdomen and hinders the action of the diaphragm, you must intervene.

In other cases the complications will make an operation necessary: hemorrhage, compression, and pain, which medical treatment has failed to control, may require you to operate. In addition there is the class of septic complications mentioned above: salpingo-ovaritis, mortification of submucous tumors, peritonitis, or phlebitis. Nor must we forget the torsion of a fibroma's pedicle.

The nature of your operation will depend on the anatomical form or clinical variety of the fibroma. When such a tumor grows rapidly and your patient is young, you can only do one thing, remove the uterus. It was customary formerly to put the removal of the ovaries on a level with this operation; but nowadays the prognosis of hysterectomy has improved so much that this is no longer done. To-day no one removes the ovaries unless on examination a radical operation is judged impossible.

Hysterectomy is again the proper operation for voluminous fibromas.

The surgeon's course in hemorrhagic fibroma depends on its seat. If it is large, interstitial, and near the peritoneum, the uterus should be removed. But when it is more or less pediculated in the cavity of the uterus, a myomectomy can be done and the uterus be respected. This enucleation may be done with or without incisions of the cervix and with or without "morcellement." If, however, after starting in to enucleate a fibroma the operation is found impracticable for one reason or another, the uterus should be removed. When the operation of enucleation can be carried through, it is a very simple one; some sterilized gauze is placed in the cavity of the uterus and the cervix sewed together again.

It is possible to do myomectomy per vaginam in some cases of pelvic fibromas, and in one instance, where a fibroma the size of my

two fists had developed towards the broad ligament, I succeeded in removing it by incising the vagina and not touching the uterus.

Myomectomy is also possible after abdominal section, though this is rare, as there are almost always other small fibromas buried in the uterine tissue; still it can be done in cases of fibromas with pedicles and when the rest of the uterus is found in a normal condition.

But as a general thing the operation necessary is *total* hysterectomy, of which there are two varieties, abdominal and vaginal. The old method of hysterectomy with internal or external pedicle has been justly abandoned, and even vaginal total hysterectomy has lost ground, and is confined to small, subumbilical tumors not larger than one's fist.

Abdominal hysterectomy is the best operation for voluminous fibromas and for such as have become jammed in the pelvis or are complicated with salpingitis, suppurative lesions, or adhesions. This is the only method that enables the surgeon to see what he is doing and to treat the complications intelligently. In this lies the great superiority of the wide and easy abdominal opening over the narrow and uncertain vaginal method.

ON THE OPERATIVE TREATMENT OF HEMORRHOIDS.

CLINICAL LECTURE DELIVERED AT COCHIN HOSPITAL.

BY E. QUÉNU, M.D.,

Surgeon to the Paris Hospitals.

Gentlemen,—Let me, as the first point of interest connected with this subject, call your special attention to the safety that characterizes the operative treatment of hemorrhoids. This lack of danger is one of the most important features of this method of treatment.

Thanks to the precautions and care with which we surround our patients before, during, and after our operations, we are in a position to state positively that the surgical treatment of hemorrhoids, which we now always use in our wards, is in all cases followed by prompt and complete recovery. The serious complications reported by some surgeons as following the removal of hemorrhoids by the knife, complications that have caused hesitation in the minds of many and that nearly threw the operative treatment into discredit, are entirely unknown to us. These results have, therefore, led us to give up the usual methods of treatment, such as cauterization, destruction by caustics, electrolysis, interstitial injections, ligating, etc., and to rely on the radical treatment alone.

Such being our rule in these cases, let us see what are the fundamental indications on which we base an intervention.

The first indication is to be found in the symptom hemorrhage, which may be serious either in quantity or through repetition. You have recently seen a striking example of this fact in the patient on whom we last operated, a man forty-three years of age. When he came to our wards, the loss of blood from his hemorrhoids had been so frequent and so abundant that he had become reduced to such a condition of cachexia that the question arose whether his was really a state of simple anæmia due to steady loss of blood, or whether there was not in his case some hidden neoplasm which had not been de-

tected. A thorough examination of the patient, however, enabled us to adopt the former view.

When, therefore, you are consulted by such a patient, the first thing for you to decide is whether the loss of blood is due to primitive or to symptomatic hemorrhoids, and this can be done only by a methodical exploration of the anus and rectum. Digital examination is the usual method resorted to, and in the majority of cases it will give you all the information you require. Still, my personal preference is for the rectoscope, which I either combine with the foregoing or use by itself. This instrument not only enables us to eliminate all idea of stricture or neoplasm of the rectum, which can be done by digital exploration, but permits us as well to detect internal hemorrhoids and to examine the condition of the mucous membrane covering them, which digital exploration cannot do.

When, consequently, the rectoscope shows us a ring of internal hemorrhoids without the presence of any other lesion, the loss of blood can be ascribed to primitive hemorrhoids, and it is only such non-symptomatic hemorrhoids that we wish to consider to-day.

A second indication is to be found in the protrusion from the anus of a small portion of the mucous membrane and in the really serious inconvenience thereby occasioned. With some of these patients a very slight effort or movement is sufficient to bring down some of the mucous membrane, and this condition of hernia gradually becomes permanent; every motion of the patient then causes it to rub against the clothing, which creates a state of irritation manifesting itself by a sensation of a foreign body, pain, or mucous and bloody secretions.

In addition to these two indications there is a third, though a less frequent one, now that patients understand more fully how to take care of themselves, which consists in prolapsus and irreducibility of the hemorrhoidal lump.

To sum up these indications in a single phrase, we can say that with internal hemorrhoids repeated or profuse hemorrhages, chronic prolapsus, easy recurrence during exercise, frequency of attacks of pain and irreducibility are all indications for operative treatment.

As regards external piles, surgical treatment is also indicated in some cases. When they are the seat of abrasions, pruritus, fissures, and inflammation due to slight attacks of local phlebitis, you cannot do better than operate on them.

When operative treatment is to be adopted, the line of action varies according to whether the patient is in a hemorrhoidal crisis or not. During such a crisis, in a first group of cases there is no prolapsus, the attack consisting in extremely painful contraction of the anus, not always due to fissure but sometimes to a small intra-anal, phlebitic coagulation. These attacks may last some time and cause such an accumulation of fæces in the rectum and bowel as almost to produce intestinal obstruction. Thus, only a short while ago I was called in to see a patient whose sigmoid flexure was stuffed with fecal matter. Diagnosis of stricture of the rectum had been made, whereas the case was nothing more than one of spasm of the sphincter. For this group of cases operative treatment is out of the question, since an empty bowel, which is indispensable, cannot be obtained. For these patients forcible dilatation is best; it will put an end to the pain, and improve, if not cure, the hemorrhoidal condition.

In a second group of cases there is prolapsus of the piles, with more or less irreducibility, amounting sometimes to strangulation. It is well to know that this very condition may be brought on by the preparatory treatment for operation. One of my patients, an elderly man, had had a large number of attacks. The purgative remedies given on the days preceding the time appointed for the operation brought on an attack of phlebitis, with prolapsus and strangulation, so that I had to change my plan and use the actual cautery instead of the operation that I shall presently describe.

A hemorrhoidal crisis is, in fact, a bad time to operate. Not only must we not choose such a moment for operation, but when such a crisis unexpectedly occurs we must, if practicable, wait until it is over. The treatment of these crises consists in hot boric spraying, hot compresses, and prolonged baths.

There are, however, some cases in which we cannot wait for the crisis to pass off, as when the swelling and strangulation of the piles cause unbearable pain, creating a serious condition. In such cases, with a damaged and mortified mucous membrane, dilatation is often insufficient, and the actual cautery has to be resorted to, according to Richet's method.

When there is no hemorrhoidal crisis, the radical cure can be safely undertaken. I have performed this operation before you seven times of late, and you can see on the board a synopsis of the cases,

with the dates when the patients entered the wards and when they left the hospital. No patient is allowed to leave without having been carefully overhauled, nor until the wound has been healed for several days. From the synopsis you will see that the operation has no gravity and that recovery is rapid. In addition to these seven cases, I have operated on three in private practice, and of the ten cases the longest was entirely well in sixteen days.

All of these patients undergo a preparatory treatment for three days and are operated on the fourth.

On the first day the patient is purged, usually with two glasses of purgative lemonade. Nothing but milk is allowed from that time on.

The following morning another glass of purgative lemonade is given, and at four or five P.M. a wafer with fifteen grains of bismuth. At eight in the evening a grain of extract of opium is administered and another fifteen grains of bismuth.

On the third morning the patient receives an enema with glycerin; at noon thirty grains of bismuth and a grain of extract of opium are given, and both are repeated at eight P.M. The patient is also cleaned and the region shaved.

On the fourth morning chloroform is given and the patient is placed in the obstetrical position with thighs upon the abdomen, an assistant being present on either side. The anus is forcibly dilated and the piles are then excised.

In the majority of cases I adopt the operation of Whitehead, of Manchester, of which the following is a brief description. An incision is made where the skin and mucous membrane meet; the right half of the mucous membrane, to which are seen hanging the venous swellings, is then dissected up to the lower edge of the sphincter, at which point the mucosa lies loosely on the subjacent layers, from which it can be rapidly separated by the finger until the healthy mucosa is reached. This is where the section takes place, and when the flap with its hemorrhoids has been removed, the skin is sutured to the mucosa. The same process is then applied to the left half.

The results, good or bad, of this operation depend entirely on the care with which the minute details of its technique are followed out, and for this reason I lay particular stress on them.

If when you have dissected up your flap of mucous membrane

with its hemorrhoids you excise it, intending to make your sutures afterwards, this is what happens. If only a small portion of mucosa has been removed, there will be no appreciable trouble for the operator, as the mucosa will not retract to any great extent and the sutures can be placed with ease. But, on the other hand, you will be exposed to the inconveniences of a parsimonious operation, and at some points the mucosa will ultimately be found in prolapsus again, and in this way the patient will be exposed again to some of the annoyances for which he underwent the operation.

It is, therefore, essential that the line of sutures should fall exactly at the margin of the anus,—if anything, rather within than without, and to obtain this result you must remove a sufficient amount of mucosa.

Let us suppose that this has been done and that the flap has been excised. The mucosa will retract and disappear from sight; the patient can be said to have swallowed his rectum!

You may think of a very simple means of preventing this: to apply artery-forceps to the retracting mucosa so as to be able to bring it down as you need it in placing your sutures. This would be about the worst plan you could adopt. Nothing is more delicate than the nutrition of the intestinal mucosa; now, sutures placed in this mucosa, no matter how careful you may be, can never be placed in conditions of complete asepsis. It is, therefore, specially necessary in such cases that the anatomical elements should be possessed of all their vitality, and each point at which you have applied a forceps is a point where union per primam will fail. Forceps must, consequently, only be placed on the vessels that bleed, until ligatures can be made, and never on the line of section of the mucosa.

Some operators have tried to get around this difficulty by only excising the hemorrhoidal flap by degrees as each suture is placed; in this way the portion not yet excised, held by forceps, can be used as a means of traction. But then another difficulty arises. When a ring of prolapsed piles is examined, each hemorrhoidal tumor is found to consist in a sort of column covered with mucous membrane. The pathological condition is, therefore, an amplification of the normal state, which is that the circumference of the mucosa is greater than that of the skin to which it joins. Now, to bring together two circles of different dimensions in a neat and satisfactory manner, one of them has to be plaited, and the plaits must be dis-

tributed at equal distances. To do this the circles must be fully freed in advance: you must do as the tailors do,—first cut, then sew.

This is how I get over this difficulty: I have the flap of mucosa held out by a Kocher forceps applied at each end; the sutures are passed through it a little above the point where the section is to pass, and the whole is then excised. In this way the mucosa does not have to be drawn down by forceps to place the sutures, as they are already placed; all you have to do is to pass one end of each suture through the skin. Sometimes I pass the needles through the skin at the same time as through the mucosa. These sutures are fairly wide apart; you have then to place sutures in the intervals, and to make your plaits. All these sutures are made with a very small needle and with fine catgut, since here, as in all intestinal surgery, the important point is to damage the tissues as little as possible.

You then apply a simple iodoform dressing, which should be removed each day by the surgeon himself or by an intelligent assistant. The surface should be cleaned at each dressing, but the wound should not be moistened if this can be avoided.

A milk diet should be enforced for twelve days, and a grain of extract of opium per diem will keep the patient's bowels from moving for the same space of time. At about the twelfth day ordinary food can be begun, and the patient will usually have a spontaneous motion; if not, a mild laxative should be administered.

With this method our patients leave the hospital in from eighteen to twenty days, sometimes in two weeks, entirely cured.

The sequelæ to the operation are generally most simple. There is little or no pain and no tenesmus. Peri-anal ecchymosis and retention of urine are about the only complications worthy of notice. All serious incidents, such as hemorrhage, suppuration, phlebitis, or stricture, are unknown to us. In a word, this operation gives a result as near perfection as we can hope to attain.

Medicine.

LARYNGOSPASM, ECLAMPSIA, AND TETANY IN CHILDREN, AND THEIR CONNECTION WITH RACHITIS AND WITH ONE ANOTHER; LARYNGOSPASM AND ENLARGED THYMUS AND THE LYMPHATIC CONSTITUTION.

CLINICAL LECTURE DELIVERED AT THE KAISER AND KAISERIN FRIEDRICH CHILDREN'S HOSPITAL DURING THE POSTGRADUATE FERIEN COURSE.[1]

BY PROFESSOR ADOLF BAGINSKY,

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GENTLEMEN,—The subject on which I am going to talk to you to-day is only a symptom, a symptom, too, of which I have already spoken to you during our talk the other day on rachitis. It is, however, of so much importance in pædiatrics that I believe it deserves a special lesson by itself. It is laryngospasm, spasm of the glottis, and it has received a good deal of attention from pædiatrists and in the literature of children's diseases during the last few years.

The symptom complex of which it is the main feature has long been known and recognized and has often been written about. As a consequence, it bears many names. Besides laryngospasm or laryngismus stridulus, the most common of these in the literature and the most interesting for us to-day are spasm of the glottis (spasmus glottidis), asthma rachiticum, Kopp's asthma, and sometimes asthma thymicum.

That laryngospasm is not infrequent is demonstrated by the fact that I can show you four cases of it to-day. Two of them are very severe. One of them, you remember, had an attack while we were going through the wards yesterday, and the dyspnœa became for a

[1] Reported by James J. Walsh, Ph.D., M.D.

time complete apnœa, the child becoming first pale then cyanotic, and its condition appearing for a moment extremely serious. Yesterday a child who was brought to the polyclinic (out-patient department) had so severe an attack that for a time it was feared death was inevitable. The other two are the milder cases, though not without their alarming features, especially in the eyes of the mother and family, that you will more usually be called upon to treat.

All the children are pale and delicate looking, though in at least three of them the layer of subcutaneous fat is reasonably well developed, and the other is not what one would call emaciated. All of them have, as you can see, some signs of rickets. There are the square head, the wide-open fontanelles, the enlargements of the ends of the long bones and something of the rickety rosary in the beaded enlargements of the ribs at the points where they join the cartilages, and, finally, the rather prominent abdomen,—the classical symptoms of rachitis.

Almost without exception laryngospasm develops in rickety children. I have seen a few cases in which it occurred without any signs of rickets being present, but such cases are extremely rare. Usually in these cases some chronic cerebral trouble, as hydrocephalus, is present, or there is a cerebral intoxication from the presence of the toxines of acute infectious fevers. The connection between rachitis and laryngospasm is not a mere coincidence, but there is a real relation of at least mediate cause and effect. On the groundwork of a rachitis develops by preference the unstable nervous equilibrium, which is upset by the slightest unusual irritation and leads to this characteristic nervous explosion in the delicate nerves of the larynx, which constitutes laryngospasm.

A very interesting observation that I have made is that children of the same family sometimes have the affection one after another, when they come to a certain age, so that there would seem to be a family predisposition in the matter. Here, of course, rachitis may play an accessory *rôle* too, for it is well known that rachitis is liable to occur in the successive children of a family.

The age at which children have the disease, as a rule, is under three years. It is most frequent at about the ages of the children we have seen it in here,—that is, from about three months to fifteen months old. It may occur, however, very shortly after birth; Thompson has described some cases of this character. It may occur

during the first few days of life, but such cases are medical curiosities always worth reporting.

Some years ago I observed the disease in a child five days old, in which the typical course of the attacks was present. There was whooping inspiration, cessation of breathing at the acme of inspiration, and then the gradual assumption of expiratory contraction of the muscles, with closed rima glottidis. Deep cyanosis supervened, as might be expected, until, finally, there was a cessation of the cramp and a deep inspiration followed. This patient got entirely well, the spasms becoming less and less frequent. In other less outspoken cases, in very young children, they have always gotten over the attacks.

This child here, who has attacks, though not severe ones, almost every time it is disturbed, is evidently about to have an attack. There is a preliminary stage of uneasy crying, almost moaning or whining; then a catch of the breath; then several catchy, cog-wheel respirations in succession, while in the larynx a tone is produced that is high-pitched, crowing in character, whence the name stridulous; then the breathing stops completely for an instant and the child remains absolutely motionless; then follows a deep, loud, long-drawn-out inspiration, and the child recovers as if from fright, to cry for some time, and after a while be completely itself again.

In the severer cases the clinical picture of the affection is much more alarming. The cog-wheel respiration is followed by complete cessation of breathing. The mouth remains open, the alæ nasi are drawn in, the facial muscles are in cramp-like contraction, the eyeballs start from their sockets, the look becomes an absolute glassy stare, the face gets red, becoming gradually darker and finally deeply cyanotic. The extremities, especially the upper ones, show spasmodic tremors. Then the pulse stops and for a time the child is unconscious. The cyanosis gives way to intense paleness, and the child sinks back into its mother's arms as if dead, all vital functions in abeyance.

On such an attack is apt to follow a series of general convulsions, which may last only for a few minutes, after which the child may appear almost perfectly well, as if nothing were the matter. Sometimes, however, every effort to restore respiration is in vain, and the children die, despite every medical help possible. Laryngospasm is in fact the most frequent cause of sudden death in children.

The spasmodic seizures may continue for some time afterwards, and it is such a case that several of you have been watching so assiduously here, but which I did not wish to talk of until, if possible, you had seen the lighter attack. This child, as you see, is having a series of spasmodic cramps: the eyes are deviated to the left and are turned somewhat upward so that more of the whites show than normal; there are twitchings of the angles of the mouth and it is drawn towards the left. The thumb is not turned into the palm of the hand, as often happens, but there are twitchings of the fingers and clonic movements of the limbs.

Between these movements an attempt to bend the limbs shows that there is persistent spasm, even during the seemingly free interval. We can bend the limbs, but a distinct abnormal resistance is evident. If you look here carefully in the lower thoracic region, you will see that the diaphragm too is involved in the clonic contractions, and at times gives a peculiar jerky respiration. The muscles of the abdomen are spasmodically contracted, and the legs are in spasm too. The sensorium is completely clouded, the child is evidently not in a condition to use any of its senses, and besides, when I prick it with a needle, you see there is absolutely no reaction. All the cutaneous reflexes are for the moment out of play.

This, of course, is the ordinary picture of eclampsia or convulsions in children. What connection has it with the case of laryngospasm that we have seen, or with this case here where the laryngeal attacks are extremely mild? One of them occurred a moment ago, and not all of you noticed it. There was a little uneasiness and a whining cry, then a slight catch in the breath, then a crowing respiration or two, then breathing became easy again and the attack was over.

The connection between these extremely mild attacks of laryngospasm and eclampsia is betrayed by the gradation observed in the attacks themselves. It is not difficult to understand that a very severe local spasm might, by the reflexes it awakened, go over into a series of generalized spasms. In fact, acute eclampsia often begins with laryngospasm; not always, however; and I do not go as far as some who seem to consider all laryngospasm to be eclamptic in character,—a larval form or an equivalent for a general convulsion.

It can be easily understood how an attack of laryngospasm may,

by producing brain anæmia, lead to eclampsia. Kussmaul and Tenner's experiments have shown that brain anæmia will in animals physiologically cause convulsions. In these cases, as the result of the cessation of the breathing, there is an intense congestion of the lungs. The work thrown on the heart is sometimes so great that for a moment it stops entirely. This produces great congestion of the brain, especially of the large and smaller venous trunks. They now occupy much more space than before, and an increase of intracranial pressure results, which drives the blood from the cortex. The anæmia thus produced causes the explosion of nerve force all along the motor tracts which we call convulsions or eclampsia.

Both of these conditions, laryngospasm and eclampsia, develop by preference in rachitic subjects. Usually associated with the rachitis there are dyspeptic disturbances. I do not think, with Flesch, of Frankfort, that rachitis is always caused by dyspepsia, though their frequent association, their mutual relations, and the modification of one by the other must be clear to all. In both there are faults of nutrition that permit the entrance into the circulation of higher and lower albumoses than those which the system can readily employ for metabolic purposes. These compounds act as toxines, and, as the infantile constitution is extremely susceptible to toxic influences, owing to the unstable equilibrium of the cellular life of the organism, not as yet fully developed and yet ever using up its quantum of force for developmental purposes, its organic functions are easily affected.

In the brain especially, as Solltman has pointed out, while development is extremely rapid, yet it is the inhibitory nervous mechanism which is longest incomplete. As the result of this, irritations that in adults, and even in older children, have no effect upon the central nervous system, lead in young children very easily to alarming explosions of nerve force. Infectious fevers, even when not severe, digestive disturbances that allow the absorption of toxic substances, though not necessarily in large amounts, rarely even the presence of intestinal parasites or the irritation produced by a tooth forcing its way through the gums, may give rise to convulsions in children, owing to the imperfect development of the inhibitory central nervous mechanism.

The irritants may act directly upon nerve-centres, as when the toxines of an infectious disease or of imperfect digestion are carried

by the blood to brain-cells, but, as we hinted a moment ago, besides this hæmatogenic irritation there is a neurogenic irritation that reflexly leads to explosions of nerve force and spasmodic seizures. This is especially true for irritation of any of the widely distributed branches of the vagus. The excitability of the vagus nucleus, for instance, is roused into activity by the irritation of a bronchitis. From the peripheral endings in the bronchi and alveoli come streaming up a series of irritative nervous impulses; finally an explosion of nerve force takes place, which makes itself felt mainly in the complicated mechanism that controls the movements of the larynx. As the physiological innervation of the larynx comes from the inferior recurrent, a branch of the vagus, it is not difficult to understand how a bronchitis might cause spasm of the larynx.

But the reflex may come as well from vagus endings in the larynx itself, or in the stomach or intestines. When a child's stomach is overloaded, or when unsuitable food has been taken, as pastry, it is quite as much the presence of the irritating material as that of any toxines which causes the spasm of the larynx that ensues, or even the convulsions. An emetic will often stop the convulsions at once. Intestinal parasites seem to act in the same way, not only by means of any poisonous material which they excrete, but also, and perhaps even more, by the continuous irritation that their presence causes. Irritation of the skin, as well as of the mucous membranes, may lead to these attacks, and sometimes even slight traumata may cause them. Just where the centre is from which these explosions of nerve force come is not so clear. Krause showed experimentally that there seemed to be a centre for closure of the glottis in the cortical region of the gyrus præfrontalis. Semon and Horsley found, on the other hand, a centre for *involuntary* closure of the glottis in the region of the calamus scriptorius.

In any case, it is much more the undeveloped state of the children, still further emphasized by that disturbance of nutritional and developmental processes which we call rachitis, that is responsible for the attacks, than any disturbance of a natural reflex arc. It is wonderful how little it takes to lead to these attacks at times, in the profound absence of inhibition which exists. Many a doctor has had the unpleasant experience of seeing a series of convulsions develop as the immediate result of a vaccination. In our day I am sure that it has more than once interfered with the progress of the

serum therapy of diphtheria, because the introduction of the injection needle was followed by a convulsion. Fright, too, in children has much more serious effects than might be expected, and often gives rise to convulsions, sometimes even to death.

In the famous case here in Berlin which threatened for a while seriously to hamper the progress of serum therapy (one of the greatest therapeutic discoveries that has ever been made,—to my mind as great as that of vaccination), there was question, in my opinion, of a combination of some such factors. In one reported case the fright of the child suddenly awakened from sleep by the introduction of the injection needle, and the intense uninhibited reaction of the undeveloped nervous system to the psychic and the physical irritation, were undoubtedly the cause of death. Even in healthy children this sensitive lack of inhibition is to be found. We need not be surprised, then, to encounter it in a heightened degree in run-down, rachitic children, where the constitutional ailment and the often accompanying dyspepsia have rendered reflexes still more sensitive and hindered normal development.

There often occurs in these conditions another set of nervous symptoms whose connection with laryngospasm and with eclampsia has been the subject of a good deal of discussion within the last few years. I refer to tetany, of course, which Escherich's work in recent years has taught us the further significance of and frequency of occurrence in children. If I compress with this rubber tube the arm of this little child here, which had the moderately severe attack of laryngospasm, you notice at once a change in the position of the hand. The fingers are pressed together in a slightly flexed position, the flexure occurring mainly at the metacarpo-phalangeal joints, and the thumb in adduction is pressed upon the fingers which partially cover it,—the accoucheur position of the hand. Then come twitchings of the muscles of the arm, in the intervals of which it can be noted that a state of spasm exists.

This is Trousseau's phenomenon, and is pathognomonic of tetany. When the nerves or arteries leading to an extremity, in the heightened state of muscular reflex activity which exists in this disease, are pressed upon, muscular twitchings accompanied by spasms, which sometimes become general, result. If I tap the muscles of the jaw here, you see the slight contortion of the face which results; this is the facialis phenomenon, Chvostek's symptom, and is due to the

hyperirritability of the facialis nerve, though it is now known that this nervous hyperexcitability exists in all nerves in tetany.

We have, then, here rachitis, laryngospasm, eclampsia, and tetany occurring together. Rachitis is the soil from which the others develop. The lowered nutritional condition is the etiological factor for tetany too. I would not go so far as Escherich and Loos have gone, and call every attack of laryngospasm a manifestation of tetany. I believe that the laryngeal spasm may occur without other nervous and muscular reflexes being heightened sufficiently to justify us in thinking of tetany. Their occurrence by preference, however, in rachitic children shows how closely they are connected together. The occurrence of tetany at times in seemingly epidemic form does not speak against its recognition as the result of a rachitic condition. Some slight infection whose characters are not well understood, and which need not necessarily be always the same, may give rise at a moment favorable for special bacterial growth (usually these epidemics take place in cool weather) to toxic substances, which still further heighten nervous excitability in these cases and so give the symptom combination we know as tetany.

Two other causes have in the last two years sometimes been put forward as playing an etiological *rôle* in laryngospasm. One of these is enlargement of the thymus, the other the lymphatic constitution. Not that either of them is now advanced for the first time, but that they have once more been brought into prominence. Laryngospasm, as we noted at the beginning, was for a time called asthma thymicum or Kopp's asthma, as in the thirties Kopp declared that the attacks were due to enlargement of the thymus; Friedleben demonstrated that this was not the case in the ordinary attacks, and then for a time, the causal effect of the thymus dropped out of sight to be brought forward again in our day.

There is no doubt that suffocative attacks, accompanied by quickened respiration, cyanosis, venous swelling, dilatation of the pupils, generalized convulsions, asphyxia, and death, may occur from enlargement of the thymus. These attacks are deceptively like laryngospasm, but are due much more to mechanical pressure upon the larynx than to reflex nervous action, though this may sometimes play a part too. That these sudden hyperæmic enlargements of the thymus are among the most prominent causes of sudden death in children I have not the slightest doubt. In the seventies I pub-

lished[1] a case of sudden death in which this seemed to be the only rational cause, and it has amused and surprised me a little to hear this *rôle* of the thymus in the sudden death of children advanced later as something new.

As to the differential diagnosis between true laryngospasm and these attacks of suffocation due to an enlarged thymus, the pathognomonic symptom is the enlargement of the thymus. This is not so difficult to diagnose, as a rule. Sometimes palpation at the upper end of the sternum will help, while an area of dulness on percussion beneath the manubrium sterni very seldom fails to indicate the true cause.

As to the lymphatic constitution, here too is an old, well-known condition under a new name. Children affected by it are described as pale and delicate, often anæmic, with enlarged tonsils, including the pharyngeal tonsil,—that is, with so-called adenoid vegetations,—with polyadenitis or lymphatic glandular enlargement all over the body, especially, however, in the cervical region, and often with an enlarged thymus. In such children, it is said, the lymph-follicles all along the intestinal tract and the mesenteric glands are on section found to be enlarged.

Such children are further said to be especially liable to infectious diseases, to which they readily succumb. If they survive infancy, they furnish the enigmatic cases that as adults die in consequence of slight attacks of pneumonia, influenza, or typhoid fever; or they die on the table during the administration of chloroform, often when only some slight surgical procedure is contemplated and no serious injury or disease has preceded; or they die suddenly from shock, as from a plunge into cold water or the like.

Subjects of the lymphatic constitution are, to my mind, only selected cases of the most outspoken form of scrofula. They are extremely irresistant to infection; hence the enlarged glands and the enlargements of lymphatic tissue all over. They are irresistant to toxic as well as bacterial action; hence the disturbance of their blood-making organs and their anæmia. That such patients should be more subject to laryngospasm or to spasmodic attacks of any kind is clear from what we have said of rachitis and dyspeptic conditions as the favorite soil from which laryngospasm and eclampsia develop. They scarcely need to be put under a new head by them-

[1] Centr. Zeit., II. Jahrgang, 1878–79, p. 409.

selves, as affected by the lymphatic diathesis, however, as this but further complicates a question of etiology that is none too clear at the best.

And now, as we have had theory enough, let us look at the practical question, how shall we treat laryngospasm? Ordinarily the first thing a physician should prescribe, according to my experience, is phosphorus. Usually when he gets to the patient the immediate attack is over, and he treats in order to forestall further attacks. In my hands phosphorus has nearly always given excellent results for this. I prescribe:

℞ Phosphorus, gr. i to iss;
Distilled water, ʒviii.
Sig.—A teaspoonful three times a day.

It often works with marvellous rapidity. After the first or second spoonful the attacks disappear, to recur no more. Phosphorus has been recommended in recent years as an excellent remedy for rachitis, so that in giving it here one is treating the condition which is the root of the trouble too. To my mind, however, the phosphorus does not act as a specific for the rachitis so much as a soothing, strengthening nervine.

Sometimes phosphorus fails to inhibit the attacks, or after it has been used for some time they recur, despite its continuance. We must then have recourse to other nervines, of which the most effective is the bromide of potassium. I have often found tincture of musk to do good. I often prescribe

℞ Sodii brom., 1.5–2 grammes (ʒss);
Tinct. moschi, 1 gramme (♏ xv);
Aquæ dest., 90 grammes (fʒiii);
Syrupi, ad 100 grammes (fʒiiiss).
Sig.—A teaspoonful t. i. d.

Where bronchitis exists, of course, the condition must be treated at once, and an expectorant will often put an end to the attacks. If dyspepsia is present, it must be treated. In a word, any affection that seems liable to set up reflex nervous trouble must be taken in hand. Any disorder in the region supplied by the vagus requires special attention, and such conditions, as they may be very varied, must be carefully looked for.

When eclampsia develops or laryngospastic attacks follow one

another at short intervals, I have found chloral the most useful remedy. I give it per rectum in the dose of half a gramme (eight grains) to a child from one to two years of age, to be repeated if necessary after two hours. To a child of three or four years I give from fifteen to twenty grains in the same way. With the zinc preparations and with arsenic or antipyrin, though some speak highly of them, I have never had any success either in laryngospasm or in eclampsia.

I often find the continuous current do good during eclampsia, and shall be able to show you, on this child here, that it has a soothing effect, at least for the time being. You see that the spasmodic movements become less frequent, that the contractures lessen, that the extremities are less stiff and more easily bent, and that the face assumes a more peaceful expression, without the contortions that disturbed it before.

The physicians of half a century ago or more used to apply leeches in these cases of severe convulsions. The overdoing of venesection, however, brought this method of treatment into disrepute. Of late I have gone back to it where other remedies failed, and with very encouraging results, using one leech for each year of the child's age. I apply them over the mastoid, because here the after bleeding may be readily stopped by gentle pressure, and I do not believe, with the older physicians, that the after bleeding should be allowed to continue, much less that it should be encouraged.

Where the attacks are severe and there seems to be imminent danger of a fatal termination, then, if the leeches have done no good, I open a vein. I believe that, as the result of the reaction against venesection, we have become too conservative in this matter. I am convinced that I have seen cases in the last year or two where the child's life was saved through the relief afforded to the congested venous circulation by removing from sixty to one hundred grammes (two to three and a half fluidounces) of blood.

I was brought to the resolution to try it by finding, at the autopsy of a child who had died from severe eclampsia, an intense hyperæmia of the brain. The brain substance was of that pinkish hue which one sometimes sees in hydrocephalus where intracranial circulation has been interfered with and all the brain-tissue has, as it were, become saturated with blood. The indication to relieve this intense brain congestion is most urgent, and, to my mind, amply justifies the added

risk as to ultimate recovery from the condition caused by the removal of a certain amount of blood, though that fluid is so important for the childish economy and its loss is so badly borne.

Not that I am to be set down, therefore, as having reverted to anything like indiscriminate venesection in children. Venesection is needed but very rarely. Here, in our immense service at the hospital, we do not employ it more than five or six times a year. When it is needed, however, I am convinced that it will often prove a life-saving measure, and as such its indications must be known to you.

PALPATION IN THE WARM BATH.

CLINICAL LECTURE DELIVERED AT THE BUFFALO GENERAL HOSPITAL.

BY A. L. BENEDICT, A.M., M.D.,

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Gentlemen,—Our demonstration this morning is of a method which is simple yet much neglected, so much so that several physicians to whom I have spoken of it lately have regarded it as a novelty. It has, however, been used in Germany, at least, for several years. This method consists in palpation while the patient is immersed in water of about the temperature of the body. The procedure is available wherever a bath-tub can be found, and, with the marked cheapening of rents in cities and the introduction of sewerage into small villages, very few of you will be so situated as to be prevented from using this means of examination. In a serious case in which the diagnosis of an abdominal or pelvic condition remains in doubt, it will well repay the patient to meet the physician at a hotel or barber-shop or other place where bathing facilities may be hired, or, if confined to bed, to have a portable rubber receptacle brought to his room.

A German writer, whose name has escaped me, has devised an ingenious set of supporting straps with hooks to fit over the edge of a tub. I have never used such a contrivance, being perfectly satisfied with the results obtained with the patient resting on the bottom of the tub. If the water comes up high in the tub, even with the head out, the abdomen almost floats. Perhaps the straps would be of material aid to an elderly physician with a stiff back. The exact temperature of the water is immaterial, or, rather, it varies with the patient. Although the utmost relaxation can be obtained from quite prolonged immersion in water so hot as to cause a feeling of faintness, it is wisest to employ a temperature in which the patient can rest comfortably without fear of vertigo or syncope. By covering

the body with two sheets, one above and one below the umbilicus, no more exposure is necessary than for palpation in bed.

Before discussing the method further or speaking of the findings in this particular case, I would like to have you begin palpating, so as to appreciate the fact that prolonged immersion is not necessary to bring about a suitable state of the muscles. You will note that your hands sink into the abdomen almost as they would into a mass of dough enveloped in a cloth, and that you do not even have to be careful to avoid pressure with the finger-tips, as in ordinary palpation. Sometimes it is necessary to put a cold wet cloth on the patient's forehead, but in this instance the patient is perfectly comfortable without it. In cases of marked reflex irritability or of painful disease within the abdomen, better results may be had after prolonged immersion, but in the majority of cases the examination may be finished within ten minutes after the patient enters the bath. By this method we get practically the same degree of relaxation as with general anæsthesia, while retaining the co-operation of the patient. The latter point is especially valuable in examining the appendix, for serious disease of this organ may exist without marked enlargement, while, on account of abnormal size or thin abdominal walls, a healthy appendix may be more prominent than usual. In these instances the statements of the patient must have considerable weight in making a diagnosis.

Only a few weeks ago I examined by this method a patient who had been complaining for some time of pain and discomfort in the right inguinal region, and whose bowels had been irregular, alternating between constipation and diarrhœa. There was so much tenderness on pressure that dry palpation was negative. There was a reasonable suspicion that the tenderness was merely superficial, due to irritation by the clothing. With the patient in the tub it was possible to accomplish a manœuvre which had failed before,—namely, the palpation of the appendix obliquely through the abdominal wall, so as to avoid the superficial tenderness. In this way it was learned that the appendix was normal in size and that it was not tender to pressure. The subsequent course of the case verified the finding.

As I do not want to discuss the present case till you have all formed an idea of the conditions, let me describe another case in which delicate palpation of the appendicular region was of the

greatest importance. In the fall of 1897 a trained nurse had a severe attack of scolecisis. A surgeon, called to operate, refused, on the ground that the patient was moribund. However, she persisted in living, and later an abscess was opened through the rectum. In February, 1898, although recovered sufficiently to engage in professional work, she was sallow, thin, and by no means in robust health. Examination in the recumbent position, both external and combined, revealed practically nothing beyond a spot of tenderness in the right ovarian region and a somewhat distended gall-bladder. The latter has some significance because in two severe cases of scolecisis I have noticed a distended gall-bladder, with evidences of biliary obstruction, and with direct tenderness and other signs of scolecisis developing only after some delay. My own theory is that the disease at the appendix causes a reflex spasm of the biliary passages. The blood of this patient presented no leucocytosis, and the proportionate count was normal. As the patient was anxious to know her exact condition, both with regard to the advisability of immediate operation and of exercise,—and, of course, in these times exercise means mainly the use of the bicycle,—an examination in the warm bath was made as soon as possible. No trace of the appendix could be found, nor was the right ovary palpable. The gall-bladder was distended, but no calculi could be felt. In the left inguinal region there was felt a crescentic wall, such as has puzzled me in one or two other cases, and which I am inclined to think is due to spasm of the iliacus internus or psoas or both. Doubt remained, however, as to whether there had been a sufficiently radical spontaneous amputation of the appendix, or whether the exudate had simply smoothed over the posterior wall of the right inguinal region. In regard to wheel-riding my advice was contradictory: I told the patient that I would advise her not to ride, but that, if I were in the same condition, I should certainly continue to ride. As to operation it seemed best to advise delay till some symptoms of acute trouble presented themselves, but to operate at their first appearance.

No further trouble has developed up to March, 1899.

The present patient is in Dr. Charles Cary's service and entered the hospital two or three days ago. Most of you have located the lower border of the liver about three-quarters of an inch above the costal arch, in the mammillary line, and have traced it into the epigastrium. Two or three have expressed the opinion that the liver

is nearly or quite normal in level. The mistake is really not due to error in palpating, but to failure to make allowance for the abdominal wall, which you must push ahead of the examining fingers or side of the hand. To estimate this as exactly as possible, we pick up a fold of tissue between the thumb and fingers and divide the thickness by two. Of course, it is better to examine the liver outside of the rectus and to estimate the abdominal wall exclusive of this muscle. The gall-bladder is not palpable. Remember that we examine for the latter just outside of the rectus and immediately beneath the costal arch, at a point northwest from the umbilicus. By auscultatory percussion yesterday the area of the liver extended from the fifth to the ninth rib,—that is, a rib less than normal, both above and below.

The other day you palpated by the dry method two female patients with floating kidneys. Those were exceptionally plain cases, and you remember the warning given at the time, that careful palpation would more often reveal slightly loose kidneys than those which could properly be termed "floating." When examining this patient in the tub, you have perhaps been a little confused by this warning. Here the first impression on attempting to palpate the kidneys is that they move under pressure, but on following them we find a rigid resistance. The first sense of yielding is due to the relaxation of the quadratus lumborum and the erector spinæ group of muscles. The same yielding may be encountered, but rarely, by the dry method.

The appendix you have felt like a small piece of express cord, in its normal region, running from north-northwest to south-southeast.

Let me say a few words in parenthesis about the use of geographic terms as applied to the abdomen. Such expressions have been used, half jokingly, half apologetically, for some years, but only occasionally. Two or three years ago, in a paper dealing with the outlining of organs, particularly the stomach, I advocated the discontinuance of the present method of locating organs by regions, or by such a clumsy imitation of Cartesian co-ordinates as "two inches to the right of the median line and half an inch above the level of the umbilicus," and urged the free use of the terms applied to the points of the compass, imagining the abdomen as a map, with the horizontal line through the upper margin of the umbilicus as

an equator, but locating points briefly by giving their distance in a certain direction from a fixed landmark. This latter method is briefer than the other, and the mental conception is formed immediately,—that is, in following a speaker who says that a certain spot is two inches southeast of the umbilicus you catch his meaning as soon as the words are out of his mouth, and have leisure to criticise his mode of speech, while by the more accepted method you often fail to grasp his point altogether, although you may easily make the computation in reading a printed article. I am very glad to say that recently this abbreviated method of localizing points in the abdomen has become more and more common.

Two or three of the gentlemen who examined this patient last have called attention to the palpability of the spleen. If the spleen can be felt, I must acknowledge an error, as I did not feel it yesterday when the patient was in bed nor in the hurried examination which I have made this morning. By auscultatory percussion it was somewhat enlarged, about as usual in cases of contracted liver, but not sufficiently to be palpable. This organ that has been supposed to be the spleen is really the stomach. Some clinicians habitually locate the stomach by palpation; personally I am unable to do so unless there is marked dilatation, hypertrophy of the muscular wall of the stomach, relaxation of the abdominal wall, or the stomach is filled with liquid or solid food. I certainly could not by the dry method feel the stomach in this patient. Now, although it is nearly three hours after a light breakfast, the organ is plainly palpable, the greater curvature being at the umbilical level, where it was located yesterday by auscultatory percussion.

It is not at all uncommon to find a small liver with a large stomach. The simplest reason for the association is that the habits of eating or drinking—especially the drinking of alcoholic beverages—which tend to stretch the stomach furnish irritating material to be carried by the portal blood to the liver, where interstitial inflammation and consequent shrinking are produced. Practically a dilated stomach is always catarrhal—using the word catarrhal in a broad sense. If you think of the hepatic condition as primary, you can readily trace, in succession, damming back of portal blood, venous congestion of the stomach, catarrh of the mucous membrane, faulty secretion, and, concomitantly, impaired motor power, indigestion, fermentation, stagnation, and dilatation of mild degree. Hemmeter

makes a very good point in calling attention to the fact that not only does hepatic sclerosis cause venous congestion of the stomach, but the opposition to the entrance of blood through the hepatic artery causes an increased arterial flow through both the primary and secondary branches of the cœliac axis which supply various parts of the stomach. The ordinary causes of hepatic sclerosis are absent here: syphilis, intemperance in drinking or eating, malaria, etc., are excluded, at least by the history, and we have no reason to doubt it. In learning the patient's vocation, I believe we have the key to the situation. He has taught a district school part of the time and when not teaching has gone immediately into hard work on a farm. The sudden physical strain and fatigue, the rapid production of waste products in a system used to comparatively sedentary life and consequent slow oxidation, would naturally affect the liver, and, by irritation, would cause a development of interstitial tissue which is prone to contract. In at least one other case I have seen a similar result of the same sudden assumption of violent muscular work, the cause being repeated season after season.

In conclusion, let me throw out a hint which may help you in practice. I have arranged to-day to make examinations similar to this in other places. It saves time and economizes mental effort to mass one's work as far as possible in this way, not, however, to such a degree as to cause fatigue from mere monotony.

Note.—One of the patients was seen in consultation with a surgeon. She was twenty-two years old, said to have been married about three months, but there was reason to suspect her moral status. She had never been pregnant, but had noticed a tumor in the lower portion of the abdomen for about two months. Menstruation had not been interrupted. By ordinary palpation the tumor was found to occupy the right inguinal and the suprapubic regions; it was hard and fixed, except for slight fluctuation in the suprapubic portion. Pyosalpinx, extra-uterine pregnancy, appendicular abscess, fibroid, cysts of different kinds, and malignant tumor were considered as possible causes for part or all of the mass. By auscultatory percussion there seemed to be a difference in conductivity of vibration, separating the mass into a suprapubic and an inguinal part. In the tub the tumor did not seem so hard, and it was slightly movable, but firmly attached to the uterus. Both external and vaginal methods of examination were employed. On the whole, the diagnosis of sar-

coma seemed most plausible. Section, a few days later, revealed a mass, partly cystic and apparently malignant, and not adapted to radical operation, on account of firm adhesions and free hemorrhage. There was no obvious separation into two parts. The tumor generally was cystic, and about a pint of greenish but clear fluid was removed. The fluctuation of the suprapubic portion was explained by the fact that the bladder was adherent to and overlapped by this part of the growth. Fluctuation was prevented in the tumor itself by the thickness of its walls. Microscopic examination showed that the tumor was a round-celled sarcoma. The fluid was albuminous: not a drop of liquid could be decanted from the test-tube after boiling. As I was not present at the operation and had nothing to do with the subsequent examination except the simple test for albumin, the report of the pathologic condition may be considered quite impartial.

PYOPNEUMOTHORAX.

CLINICAL LECTURE DELIVERED IN THE ROYAL VICTORIA HOSPITAL.

BY W. F. HAMILTON, M.D.,

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GENTLEMEN,—The patient whose case is presented to you to-day shows typical signs of a somewhat rare condition and illustrates several points of interest, while he affords us also an example of how exceptions sometimes may be seen to the rules respecting the temperature and pulse during pus formation and the presence of pus in any part of the body.

The patient first came under my care October 5, 1896. At that time he remarked that during the previous three years he had not been in the enjoyment of his usual health, and that a cough with gradual failure of strength had marked the change from his normal state. Since July 17, 1896, the shortness of breath, which was in October his chief complaint, had been distressing, and it was gradually increasing in severity.

Though able to attend to his work as a mail-driver in a country district up to the 17th of July, 1896, he was compelled on that date, through pain low down in the left side and distressing breathing, to leave off his work and to rest in bed. There he remained upward of two months.

When he again began to go around he found himself weak, short of breath, lighter than usual, and without much appetite. As time went on, he observed that on sudden movements a splash could be heard in his left side, and that his heart was pulsating well over to the right nipple-line, while the normal area of cardiac impulse was free from palpable and visible pulsation.

The members of his family are reported as having been free from hereditary diseases, with the exception of one sister, who died of

pulmonary tuberculosis at the age of thirty-two, the age which this patient has reached.

In his own history we would note the following points: he was never ill until three years ago, though he says he had a tendency to "take cold." He never had rheumatism nor any acute severe pulmonary disease. He never spat blood, nor has he suffered from chills or sweating either diurnal or nocturnal. The expectoration has never been profuse; it is less in quantity since his illness; it began in July, as already mentioned, and, what may seem strange to you, in view of what we are about to demonstrate, his flesh has not wasted. Indeed, he believes that in this matter there has been slight improvement since July.

We must not forget to remark also upon the mode of onset of the pain, complained of as having occurred low down in the left side. It was very severe, and much aggravated by deep inspiration. The temperature on the day when he first came under my care was 98° F., the pulse 120, the respiratory movements 36 per minute.

So far I have given you an outline of this case as it developed before he was first seen in Montreal. He has now been under pretty close observation for about a year, and after we have examined into his present condition we may review with much profit, it is hoped, the points in the development of the case and discuss those of most importance.

You observe that the patient is a man somewhat above the average height, and with well-developed trunk and limbs. The surface is pale, but no cyanosis is present. The fatty and muscular tissues are wasted. At one time, a few years ago, he weighed one hundred and eighty pounds. At present he does not weigh more than one hundred and forty pounds. There is no clubbing of the fingers. He moves about with ease, and only on severe exertion does he experience any inconvenience or distress from shortness of breath. His temperature is 98° F., the pulse is regular at 80, and the respirations rarely exceed 24 per minute. His appetite is good and he sleeps well. He does not suffer any pain at present, and his cough, which occurs at intervals, is attended with scanty greenish expectoration.

From this review and examination, gentlemen, you have already decided that we have in this case to do with some disease or disturbance of function of the thoracic organs, and most likely with those of the respiratory system. Let us, then, examine this system. The

visible signs suggest an involvement of the left lung, for, although the chest is well formed, there is a marked degree of flattening over the left half of the thorax, from the clavicle downward. The respiratory movements here show much limitation, and the cardiac pulsation, invisible to the left of the sternum, is seen in the epigastrium and in the fourth right intercostal space. While there is flattening when viewed in front, we notice also a bulging in the left axillary region. The palpable signs confirm those already enumerated and give us the additional evidence concerning the voice. Vocal fremitus, much diminished over the upper part of the left lung, is absent at the base, while it is practically normal on the right side.

The audible signs in the right side are nothing more than a slight harshness of the respiratory murmur and a few crepitant râles at the apex of the lung. The percussion note over the left side is much altered. In the supraclavicular and infraclavicular regions the note is dull. In the mammary, upper axillary, and scapular regions it is tympanitic, and of a dull quality; while from these areas downward the note is flat and there is a sense of resistance felt on percussion. The breath sounds are practically absent over the flat area, yet at its upper limit posteriorly "metallic tinkling" is audible. The breath sounds in the region of the upper lobe are harsh: expiration is prolonged, and numerous moist and dry râles are heard, some of very high pitch, while the voice sounds here are intensified. An interesting feature, and one of special diagnostic value, is observed when the patient quickly or suddenly shakes himself. Generally speaking, when he does so a "splash" is audible both to the examiner and to the patient as well. This has been frequently observed by him while walking upon the street or in going down-stairs. The coin sound, of almost equal value as a diagnostic sign, is most characteristically heard in this case, and, as it is so widely audible, it suggests an extensive displacement of lung tissue. In some instances the boundaries of the cavity occupied by air may be accurately determined by this auscultatory percussion, which gives in such cases a peculiar metallic resonance, spoken of by Trousseau as the "bruit d'airain." In applying this test to map out the air-containing cavity of the pleura, we find that, with the exception of a small area, about two and one-half inches wide, extending from the spinal column towards the left axilla a little below the spine of the scapula, it is

well heard. This area is somewhat wedge-shaped, with the base on the spinal column. It suggests that we have here to do with the collapsed and partially infiltrated lung, while the remaining portion of this pleura is free of lung. The *bruit d'airain* is heard with remarkable clearness both over the base and over the apex of the left thoracic cavity, and laterally in the axillary region. The point of maximum intensity is below the angle of the left scapula, the coin being tapped in the infraclavicular area of the same side.

Passing now to examine the other systems, we note that the heart does not pulsate in the normal area, but that a pulsation is seen in the epigastrium and in the third and fourth interspaces to the right of the sternum. The palpating hand discovers that the lower portion of the sternum moves forward with each cardiac impulse. The auscultatory cardiac phenomena depart but little from the normal, not more so than may be accounted for by the altered position of the heart and the increase of pressure in the pulmonary circulation.

The other systems show no signs of disease. The skin over the hands, however, as you have noticed, is patchy, as seen in what is called leucoderma.

The urine is acid, has a specific gravity of 1008, contains no serum-albumin nor casts, but a trace of nucleo-albumin.

From the evidence thus obtained, gentlemen, we are confirmed in our belief, suggested by the patient's complaints, that there is some diseased condition of the respiratory system.

On the 6th of October, 1896, this patient's left pleura was aspirated and upward of one hundred and twenty ounces of somewhat turbid serum withdrawn. During the operation no discomfort was experienced, and but a slight cough was induced as the process was about completed. The heart gradually moved towards its normal situation, the apex-beat resting finally, however, in the epigastrium. After a few days in bed, during which time his temperature remained normal, he got up, and has not been so confined since except for a repetition of this operation. The pleural sac has been aspirated four times, and the quantity of fluid withdrawn has been less on each subsequent occasion. The consistency has altered as well: whereas at first there was but slight turbidity, that which came away last, in August, was purulent and much thicker. During the last aspiration considerable gas escaped with the pus, and towards the end of the operation much distress, described as a "pulling, tear-

ing pain," was experienced in the epigastric, substernal, and left mammary regions.

You have now heard, gentlemen, the history of this case so far as we know it. From this alone a diagnosis is clear. We have here to do with a case of pyopneumothorax. It is not always that you can be put in possession of such a complete history. This case, however, from the physical signs alone is almost, if not quite, as clear; the points afforded in examination are quite pathognomonic. Briefly enumerated, they are as follows:

1. Displacement of the heart and mediastinum.

2. Tympanitic resonance over the greater part of the left lung area, with feeble breathing and dulness at the base.

3. Metallic sounds, including metallic tinkling and the *bruit d'airain.*

4. Hippocratic succussion.

1. Displacement of the heart does not always occur, it is true, yet so constant a sign is it that it is remarkable how recently only it has been described. Notwithstanding the writings of Laennec and others on this subject, it remained to M. Gaide, in 1828, to describe and lay special stress upon this as a point in diagnosis. One may readily suppose that in such cases, where strong pericardial and pleural adhesions have been formed, as well as in those where the opposite lung is consolidated, such a mediastinal displacement would not be found. So quickly does the displacement take place that, even before the first severe pain following the perforation is over, the heart cannot be found in its normal place. I recall the remark made by the first patient whom I had under treatment with this condition. He was a very intelligent young man, recently at Saranac Lake for phthisis. One day after dinner, while lying upon his bed, he was seized with a severe pain in his left side and experienced a faint feeling. "Believing," as he said, "it was heart failure, I put my hand in my bosom to feel my heart beat, but it could not be found in the right place." Shortly after, his physician found the apex of the heart in the region of the right nipple, and every characteristic sign of pneumothorax well marked.

It would appear that such a change of position must arise from one of two possible causes,—either increased intrathoracic pressure, by which the heart and mediastinum are pushed over, or diminished traction of the elastic lung on the affected side, leaving the other

in a normal state of elasticity unopposed. From the rapidity with which, by clinical observation and experiment, cardiac displacement takes place, it is pretty well established that increased intrathoracic pressure does not exist. Again, the lung of the affected side loses its elasticity; hence we may believe that the heart is pulled rather than pushed aside by the healthy lung.

2. The characteristic variety of percussion note is readily understood, but in this considerable variation may be observed, owing to the tension of the chest wall. When pneumothorax occurs, in a very large percentage of those cases where life is prolonged some form of fluid exudes from the pleura. Generally a purulent pleurisy is induced and then the characteristic basic dulness is found.

3. Metallic sounds are not characteristic of pyopneumothorax, since they are sometimes heard in other thoracic conditions, yet they are very frequently associated with the condition which this patient illustrates so admirably. Pulmonary cavities, however, may give such sounds, and even the coin sound, or *bruit d'airain*, may be heard over large, smooth-walled cavities. Indeed, according to Osler's note recently published, this sign was present and a localized pneumothorax was strongly suspected. The autopsy revealed a large cavity, the walls of which were covered with "granulation tissue, and presented here and there papillary projections which on section contain remnants of branches of the vessels and bronchi."

4. Hippocratic succussion, audible to both patient and examiner in this instance, is a conclusive sign, concerning the presence of air (gas) and liquid simultaneously in a cavity.

Once our diagnosis is established, we may go a little further back and ask what is the most likely cause of this condition.

We have found this condition in a patient who gives a history of bronchitis, with an acute illness necessitating his going to bed, possibly an attack of acute pneumonic phthisis followed by pleurisy. His expectoration shows tubercle bacilli, and on two occasions in the fluid from the chest the same micro-organism was found. Thus, that cause which is said to produce about ninety per cent. of all the cases of pneumothorax has certainly been at work here. Other causes at work in the remaining ten per cent. of cases are empyema, gangrene, and traumatism, while but very few cases indeed result from diseased conditions in the alimentary tract. All such cases are

associated with perforation, which, if opportunity of examination be afforded, is demonstrable. On the other hand, it must be admitted that there are cases with no sign of perforation, in which gas may be found with pus or decomposed blood within a serous cavity, and thus, if within the pleural cavity, we may have what Laennec described as pneumothorax without perforation. An opportunity of seeing such a case was afforded the staff of this hospital a short time since.

A patient under treatment for a severe form of appendicitis was operated on, and a few days after developed signs of disease in the right lung, and subsequently in the pericardium,—signs leading to a diagnosis of pneumonia and pleurisy of the right side, with hydropneumo-pericardium. The autopsy confirmed the diagnosis, and revealed further a pyo-hæmo-pneumothorax of the right side as well as pleurisy of the left side. The pericardial effusion was similar to that in the pleural cavity, but the pus elements were more scanty. An examination of the abdomen showed a suppurative track,—a retroperitoneal dissecting abscess, extending upward,—traceable along the inferior vena cava to the diaphragm. Viewed from the pleural side no perforation was discoverable, but at that point where the inferior vena cava emerged through the diaphragm a reddish, grumous, broken-down area of tissue existed. The pericardium presented no such area suggesting perforation. Now, if pneumopericardium can originate without any perforative signs, as it doubtless did in this case, it is quite as possible for pneumothorax to originate in the same way; and this case probably illustrates that type of case which may occur without perforation. In an examination of the organs taken from the body of this subject, made by Dr. A. G. Nicholls several months after the autopsy, an organism was found in large numbers which corresponded to the bacillus aërogenes capsulatus. There is no doubt that the presence of this organism explains the pneumothorax and the pneumopericardium. Others, as R. May and Adolf Gebhart, more recently report a similar condition due to the bacterium coli.

E. Lévy, of Strassburg, reports a case of pneumothorax in which no perforation was found, but the exudate contained on two occasions an anaërobic micro-organism capable of producing gas in cultures as well as in guinea-pig tests. From the clinical history of his case it would seem that this infection was one of secondary character,

and in presenting his report Dr. Lévy makes a plea for an *essential pneumothorax.*

Pneumothorax occurs not infrequently in those apparently healthy; such cases may recover within a few weeks, and no sign of the cause of such a condition is to be found. On this account, several observers have held that such a condition may occur in a healthy lung.

Among others, Samuel West strongly opposes such teaching, maintaining, on the following grounds, that in all probability a lesion has been the cause of the affection.

(*a*) Lesions may escape the closest clinical observation.

(*b*) Recovery may be complete from pneumothorax even though there be a tuberculous process as a cause.

(*c*) The bursting power of a *healthy lung,* though variable, is greater than could be exerted by any expiratory effort.

The prognosis in cases of pyopneumothorax is generally grave, and appears to depend largely on the variety of opening through which the air enters,—that is, whether valvular or not. Not infrequently death ensues very shortly after the rupture into the pleural sac, and it is within the first few days, at least, that the greatest danger exists. According to Dr. Samuel West, seventy-five per cent. of cases of pneumothorax die within the first fourteen days, while ninety per cent. die within the first month. Powell's statistics, taken from thirty-nine post-mortem records at the Brompton Hospital, published in 1886, show that the greatest duration of life was twelve months, while the least duration was ten minutes. Laennec, who is said to have first accurately described this condition, reported a case of six years' duration; while Fuller, in "Diseases of the Chest," records a case of pneumothorax lasting twenty-seven months.

So far as we are able to forecast the progress of this case, we may say that chronicity will characterize it, and many more months are promised in the past history and present condition. We may expect, however, from the suppurative process, that amyloid disease may result, although no signs of that condition are yet apparent in his case.

Further, your attention is drawn to what appears to be, without doubt, the salutary though temporary effects incident upon the development of pneumothorax; you are, doubtless, aware that reference is made to the "setting back," or retardation of the tuberculous

process in the lung of the affected side. That such is the case is pretty clearly shown by the following facts:

(*a*) The quantity of matter expectorated has been until recently very scanty.

(*b*) There is a total absence of febrile movement except after the application of the tuberculin test, when there was fever for but a few hours.

(*c*) The patient shows but little tendency to emaciate; on the contrary, he has put on flesh while under observation in the hospital. Such a salutary change in the tuberculous process may be seen not infrequently in those cases of pneumothorax which become chronic, and is due, doubtless, to altered blood-pressure and blood-supply within the diseased lung. In those cases which make a complete recovery the perforation becomes healed, the effusion, if any, is absorbed, as well as the contained air or gas, and the lung may again perform its function, depending, however, upon the degree of infiltration and adhesions formed.

In speaking of the treatment to be followed, one can only say that we must be guided chiefly by the stage of the disease and the symptoms demanding relief.

For example, in the earliest stage of this condition the pain and dyspnœa in many cases call most urgently for treatment. To this end, the administration of opiates and puncturing of the pleura may afford prompt and satisfactory relief. The dyspnœa is most marked in early cases where there is a valvular opening. Then the pressure and distention are severe, and it seems reasonable to urge early and fearless resort to puncture as a safe operation and one which, while it can do no harm, is very likely to do much good.

The treatment which this patient has undergone has been little more than that which has been applied for the relief of dyspnœa, which recurs with the increased pressure due to fluid accumulation in the left pleural sac. The dyspnœa arises, doubtless, not so much, if indeed at all, because of compromised movements on the left side, but by reason of the involvement of the right and only useful lung by the pressure transmitted through the already displaced mediastinum. Aspiration has been resorted to on each occasion, as already mentioned in giving a report of the case, and good results have invariably followed. There is no evidence to show that the use of the aspirator has induced a reopening of the pleural perforation, for that

seems to have been constantly patent. We were mindful of the teaching of most authors on this point.

Besides the local treatment, the patient has been using creosote and cod-liver oil and other supporting measures. Since there is an empyema to deal with, it is almost needless to say that the question of more radical operation has been raised and discussed. In consultation with Dr. Bell some three months ago, it was decided, in view of the patient's tubercular condition, that any further interference than that which was being so easily done, and with apparently such good effects, was scarcely justifiable.

In Stephen Paget's recent work on Surgery of the Chest you may find the subject of chest puncture in pneumothorax favorably presented.

It was my intention to review, in the course of this lecture, all the cases of pneumothorax on record in this institution since it was opened. Time is not afforded me, however, for more than a brief reference to them. There are six such cases; five occurred in phthisical subjects and one in a subject of peritonitis, the one already referred to as having had a pyo-hæmo-pneumo-pericardium as well; four were on the left side, two were on the right side; five were in men, and one occurred in a girl of fourteen years of age.

After other such cases have come under our observation, we may again revert to this subject and present in another lecture other aspects of this very interesting condition, which, I trust, has become clearer to you by reason of this case and the remarks upon it.

THE VALVULAR DISEASES OF THE LEFT HEART.

CLINICAL LECTURE DELIVERED AT THE ARAPAHOE COUNTY HOSPITAL.

BY J. N. HALL, M.D.,

Professor of Medicine in Gross Medical College, and Visiting Physician to the Arapahoe County Hospital and to St. Anthony's Hospital, Denver, Colorado.

Gentlemen,—I have shown you heretofore isolated examples of each one of the ordinary left-sided valvular diseases, and purpose to-day to show you typical cases illustrating each of these, that you may better fix their characteristics in your minds. At each of the two valves of the left side of the heart we may have either a leak or an obstruction, regurgitation resulting in the former case, while the stenosis in the latter one interferes with the onward passage of the blood. I have selected these four patients before you because each one serves as a typical example of one of the four valvular diseases which are thus possible in the systemic side of the circulation. Without going into the histories of these cases I shall call your attention to the salient points, especially in the diagnosis, in each one, after which you will have an opportunity of examining them.

Aortic Stenosis.—The first patient is a miner, sixty-nine years of age, who has done much laborious work in our mountains, has used alcohol freely, and has had several attacks of rheumatic fever, but is, nevertheless, in a reasonably good state of health. His chief complaints are of dizziness, blindness, and faintness upon suddenly assuming the erect posture, and of moderate dyspnœa upon exertion. I will mention here that the latter symptom, in this case, comes rather from a moderate mitral regurgitation, from which he suffers, than from his aortic stenosis. The other symptoms arise from the inability of the heart to supply the brain with its proper amount of blood.

We find that the patient has well-marked atheroma in all of his accessible arteries. The pulse is slow and small, but of fair tension.

The apex-beat is in the fifth interspace, under the nipple, and the cardiac dulness extends from the right edge of the sternum to the nipple line. This dulness, you must note, is greater than is usual because of the mitral lesion, for the area of dulness is but slightly increased in pure aortic stenosis, since the hypertrophy of the left ventricle resulting from the obstruction is a simple one, the cavity of the ventricle not being notably dilated. Over the second right interspace we feel a pronounced systolic thrill, due to the vibration set up in the obstructed aortic orifice by the onward current of blood, impelled by a left ventricle stronger than normal because of the necessity of overcoming an abnormal resistance at the point of stenosis. With the stethoscope we hear an exceedingly loud, harsh, sawing murmur, corresponding in time and duration to the systolic thrill. It is transmitted into the neck, and even to the femoral arteries. A point of much importance is the complete absence of the second sound, generally absent in these cases because the aortic valves are so stiff and so much tied down by the stenotic process that no sharp valvular snap is possible after the ventricular contraction. The murmur is not the soft one heard in young anæmic patients, and it is much more widely transmitted than that one, which, further, never produces thrill. It is much more common to have a systolic murmur here from atheromatous roughening of the intima of the aorta than from stenosis, but neither the thrill nor the cerebral symptoms would be present in such a case to such a degree. Aneurism of the ascending aorta has been mentioned in this case, but the long duration of the condition,—for the patient has been here for six years or more,—and the utter absence of pulsation, pain, tumor, abnormal dulness, and signs of pressure within the chest, as shown in the pupil, the larynx, the bronchi, and the vessels of the arms and face, lead us to throw it entirely out of consideration. This patient requires no cardiac treatment, since his compensation is as perfect as is possible under his circumstances, and we are powerless to alter the condition of his aortic orifice. He is fortunate in being free from pain, so often associated with aortic lesions in atheromatous subjects. With good shelter and food he will probably be able for some years yet to assist about the kitchen, as he has done heretofore. He has taken at times ten-grain doses of potassium iodide after his meals, with the hope of retarding and perhaps benefiting his arterial condition, but no marked results are to be expected from this or any

other medication. Aortic stenosis, in sufficient degree for diagnosis during life, is much less frequent than the other valvular lesions of the left side of the heart. There are no evidences of aortic regurgitation in this case, although it is frequently associated with stenosis.

Aortic Regurgitation.—The next patient is a man under thirty years of age, a laborer by occupation, with a pronounced rheumatic history, and suffering from a leakage through the aortic orifice. Incompetency of the aortic valves is frequently the result of an acute rheumatic endocarditis, as in this case, but still more commonly we find that it originates in a slow, chronic, deforming endocarditis associated with changes in the intima of the aorta, occurring in men in the prime of life, who have done laborious work, used alcoholics freely, and in many instances have suffered from syphilis. The increased vascular tension brought about by severe and prolonged muscular effort is of particular importance in this disease. It is, therefore, the especial cardiac trouble to be expected in old soldiers who have made hard marches, in athletes, and in other men subjected to similar strain. The greater frequency of the disease in males is thus easily accounted for. As this patient is still in the stage of perfect compensation, he has practically no cardiac symptoms, but is here for treatment of his rheumatic condition, and will shortly be discharged.

Upon examination we note, first, the tremendous pulsation in his visible arteries and the powerful apex-beat in the sixth interspace well outside the nipple line. When the pulse-wave strikes the finger you note its unusual strength, but it is deceptive, since, from the regurgitation from the aorta through the insufficient valve back into the left ventricle, the pulse is not sustained. When well marked, this Corrigan pulse is pathognomonic of aortic regurgitation. In such a case, you remember, I have recently shown you the capillary pulse under the nails, and in the lip when pressed upon with a glass slide. If you grasp this patient's forearm when raised, you may actually feel it enlarge in your grasp with the cardiac systole, while his radial artery seems to slap against the palm like a wet cord, from its sudden and great distention.

The area of cardiac dulness is increased both transversely and vertically, extending from the third interspace to the sixth, and from the right sternal border to the extreme left of the apex-beat,

an inch outside the nipple. The area is larger than in any of the other conditions which we consider to-day, since the left ventricle is much more dilated, as well as hypertrophied, than in them. The heaving impulse of the powerful heart is felt over the whole precordia and is easily visible. As in many of these cases, the left chest is more prominent in the cardiac region than upon the right. Upon auscultation we hear a soft, blowing murmur over the second right interspace, which grows more distinct as we trace it in the direction marked by the arrow, towards the apex, its point of maximum intensity being in the middle of the sternum. By watching the systole of the heart we find that this murmur occupies the entire diastole. Over the aortic valves we hear the feeble second sound, showing that in this case there is sufficient valvular action to give rise to a sound still audible in the presence of the murmur, although this is by no means always the case. The murmur is not transmitted to any great extent into the arteries of the neck, but the second sound is heard quite distinctly. The diastolic thrill, sometimes found in these cases over the aortic cartilage, is not present in this case, but the murmur alone is pathognomonic of regurgitation, since it cannot be propagated towards the apex from the aortic valve by any other movement of the blood in the heart.

We have, then, as diagnostic points, the diastolic murmur transmitted downward, the great enlargement of cardiac dulness of the form mentioned, the bulging chest-wall, the powerful heart-action, the Corrigan pulse, and the feeble aortic second sound. The patient, like the last one, is happily free from the severe pain so much more frequently seen in aortic diseases, and especially insufficiency, than in other valvular diseases. His prognosis is worse than that of patients with other valvular lesions, since failure of compensation is likely to come sooner, and he is meanwhile much more liable to sudden death from rupture of a degenerated cerebral artery (for all the arteries sooner or later become atheromatous in this disease), or from sudden or gradual blocking of a coronary artery, and to severe cardiac pain or even angina pectoris. Still, from his comparative youth and his excellent compensation, he may look forward to several years of tolerable health if he leads a careful life and avoids severe muscular labor. His treatment, meanwhile, should be purely symptomatic. We shall on his discharge give him some iron, to guard against the anæmia so commonly seen in these patients.

Mitral Stenosis.—The next patient is a woman, fifty-two years of age, who has long suffered from rheumatism, and for one or two years has had at times slight œdema of the feet, palpitation, dyspnœa on exertion, cough, and other signs of a failing circulation. She illustrates very well the condition of mitral stenosis, which is most commonly found in females who have suffered from rheumatism or some of the infectious diseases. Probably anæmia and chorea are of more importance to the origin of the endocarditis at the mitral valve from which arises subsequent valvular disease than we have hitherto believed. In my own experience mitral stenosis is rather less frequent than aortic regurgitation, although many authorities make a contrary statement. Both together do not equal in number the cases of mitral regurgitation seen in ordinary practice. When this patient entered the hospital, she had the symptoms mentioned, and was unable to sleep while lying flat in bed because of congestion of the lungs, although no marked pulmonary œdema existed. She has slightly clubbed and cyanotic nails often seen in patients with obstruction in the pulmonic circulation. Upon inspection we find that the heart beats in the fifth interspace, just outside the mammillary line, although a wavy impulse is seen over much of the precordial area. The dulness is much greater than in health, chiefly owing to the dilatation and subsequent hypertrophy of the left auricle and right ventricle. The dulness is fairly characteristic of this disease, since it extends from beyond the right border of the sternum to an inch and a half to the left of the left nipple, and from the third rib to the point of the apex-beat. Owing to the dilatation of the left auricle you will note that the line of dulness extends higher and farther to the left than in the case of aortic disease.

Upon palpation we miss one of the most characteristic features of mitral stenosis, for which I confidently looked at the first examination,—namely, a presystolic thrill over the region of the apex-beat. A thrill is more commonly found in this variety of valvular disease than in any other, and is, when present, practically pathognomonic of it. Inasmuch as the thrill occasionally disappears when compensation fails, we shall look for it after the patient has been treated, for it may in that case reappear after the heart has regained its strength.

Upon auscultation we find over a space of the size of a silver dollar, just within the nipple, a typical rumbling or blubbering pre-

systolic murmur. No murmur in itself is so characteristic of a given valvular lesion. It may be graphically represented upon the blackboard by a series of r's, thus: r-r-r-r-p, ending with the letter P, the murmur becoming louder and rougher from the beginning. This last letter represents the sharp and forcible first sound of the heart, and is followed at the usual interval by the second sound. The murmur is so different from the sawing sound of aortic stenosis, from the long, soft, blowing sound of aortic regurgitation, and the "whish" of mitral regurgitation that it may often be recognized by the practised ear before there is time to learn its exact relation to the systole of the heart. In time we find that it ends with the first sound and the apex-beat. The second sound stands out clearly in the interval, and it is not until an easily appreciable period after the second sound that the murmur begins. It is a presystolic murmur, speaking with reference to the ventricular systole, although it would really be better to speak of it as an auricular-systolic murmur, since it occurs in the time of the auricular systole and is generated by the current of blood forced by the auricle through the narrowed mitral orifice. When we listen over the second left interspace near the sternum, we find that the pulmonic second sound is much louder and sharper than the aortic second sound upon the other side of the sternum. There are two reasons for this: first, because of the backing up of blood upon the lungs through the inability of the left auricle to empty itself, the right ventricle has become hypertrophied, and maintains a higher tension in the pulmonary artery than normal, thus causing the pulmonic valves to shut more forcibly than usual; and, secondly, owing to the difficulty in filling the left ventricle, because of the stenosis, the aorta is less well filled than usual, and hence the aortic valves close less forcibly than in the normal heart. You will note, in this connection, the poor tension in the systemic arteries as shown by the pulse, although this is still regular and but little increased in frequency. The tension is much better and the pulse-rate much less since the administration of digitalis.

If you will note the second sound of the heart carefully over the middle of the sternum at the second interspace, you will perceive that there is a slight blurring of the two sounds, originating respectively at the aortic and pulmonic orifices. This partial reduplication of the second sound, often much more pronounced, is more frequently heard in mitral stenosis than in any other valvular dis-

ease. It originates through the earlier systole of the right ventricle, and consequently earlier closure of the pulmonic valves. This ventricle becomes filled with blood through its normal auriculo-ventricular orifice sooner than the left ventricle through its stenosed opening, and, as a certain intraventricular pressure is essential to the initiation of the systole, and this is attained sooner upon the right side, aided still further by the obstruction existing in the pulmonic circuit, this ventricle contracts first. This reduplication, which may be very distinct at the time when weakening of the myocardium has rendered the murmur temporarily inaudible, is, when well marked, regarded by Guttmann and some other authorities as an important sign of mitral stenosis. This patient is rapidly regaining her compensation under half-ounce doses of the infusion of digitalis, and will soon be able to go home, to remain until another break occurs in this beneficent process by which nature overcomes for a time the serious obstruction in the circulation.

Mitral Regurgitation.—The last of the four patients illustrates the most common form of valvular disease, mitral insufficiency. Although she is eighteen years of age, she does not appear to be more than fourteen, for her circulatory trouble has dwarfed her seriously, as is often the case in young patients with heart-disease. She has suffered from severe scarlet fever, from two attacks of diphtheria, and from one of typhoid fever, during the last ten or twelve years. From one of these, most probably the scarlet fever, she evidently developed an endocarditis of the mitral valve, which has extended until the leaflets are utterly incompetent to close the orifice, as we shall endeavor to prove to you. The patient complains of cough, dyspnœa, swelling of the feet, inability to sleep, and for a week past has had almost daily hæmoptyses. She was pretty thoroughly exhausted upon entrance. Upon inspection she presented at that time a most characteristic picture of this form of heart-disease. The œdematous feet, the congested face and skin, the cyanotic nails and lips, the wide area of cardiac pulsation, wavy in character, the heaving, visible impulse, the bulging left chest, the dyspnœa amounting to orthopnœa, and the telltale bloody expectoration in the basin made up a group of signs that he who ran might read. Feeling for the apex-beat and noting the marked systolic thrill, I told the house physician that our snap diagnosis of mitral insufficiency was already confirmed, without the use of the ear. The cardiac area is flat over a surface

reaching from an inch to the left of the left nipple to an inch and a half to the right of the sternum, at the level of the fifth rib. The apex-beat is at the left-hand edge of this area in the fifth space, although the wavy impulse, so characteristic of dilatation, is to be seen over the whole region from the nipple to the sternum. Upon palpation we note the tremendous heaving impulse of the enlarged heart, and the systolic thrill over the whole apex region. Remember that that thrill, although found occasionally in regurgitation, is very much more common in mitral stenosis. With the ear or the stethoscope we hear a loud and, for a mitral systolic murmur, rather harsh sound, replacing the normal first sound of the heart, easily determined to be synchronous with the thrill and the heaving impulse of the heart, and most distinct as we approach the apex. It is to be heard over the whole heart, however, and one must guard against the error of believing that a separate systolic murmur is present at the base. It is transmitted to the left, and is very distinct under the left scapula. Even in the right axilla it is heard distinctly, as is frequently the case in a child's chest,—for this patient is really but a child. The pulmonic second sound is loudly accentuated. One would anticipate a pulsation in the cervical veins in a patient with a heart so far diseased, but apparently the tricuspid valve is as yet competent, since no pulsation exists either here or in the liver, nor can we distinguish a systolic murmur over the lower end of the sternum or to its right. It is doubtful, however, in the presence of such a widely transmitted murmur as this one at the mitral, if such a tricuspid murmur could be distinguished if present. The fine râles in the lower chest noted upon entrance have cleared up. They were doubtless due in part to œdema of the lungs and in part to blood effused into the smaller bronchi during the hæmoptyses from which she suffered, and which originated in the tremendous pulmonary congestion. These bleedings are equally frequent in mitral obstruction, and are due to the same cause. They are often of benefit to the patient by depletion of the congested lungs.

We find that her liver extends two inches below the free margin of the ribs, owing to the same passive congestion which caused the œdema of the feet and the lungs, and which sooner or later affects the spleen, the kidneys, and the digestive tract. The urine of this patient is the only one of the group which has more than a bare trace of albumen, this latter amount being found in the last case. This

patient has probably one-fourth per cent. by weight, with granular casts and renal epithelial cells in the sediment. There is as yet no evidence that this is more than might occur from the severe passive congestion.

This murmur originates from the backward current of blood from the left ventricle into the left auricle during the systole of the former, and the thrill occurs because the valve-segments are set into so violent a vibration that it is communicated to the chest-wall as a palpable fremitus. The result of the backing-up of the blood is practically the same as in the last case,—over-distention of the left auricle, then of the pulmonary veins, then of the lungs, with dilatation and subsequent hypertrophy of the right ventricle as a consequence. It is likely that after a time the dilatation of the right ventricle will lead to relative insufficiency of the tricuspid valve and general systemic venous congestion of more marked degree than at present exists, and perhaps systolic pulsation in the veins of the neck. We gave this girl upon admission a calomel purge, followed by Rochelle salt, this being particularly indicated by the passive congestion of the liver and the digestive organs. She also received every three hours for two or three days a half-ounce of infusion of digitalis, this being the best treatment, probably, for the hæmoptysis of cardiac origin as well as for the other symptoms of failing circulation. The bleeding ceased, the irregular pulse fell from 130 to 74 per minute and became much more regular, the œdema disappeared gradually, and she slept flat in bed on the third night. The drug was stopped at this point because of the slow pulse, but will be resumed in smaller doses in a day or two. Let me advise you not to hesitate to give large doses of digitalis when the drug is so urgently needed. Only last week I saw, with another physician, a girl of nineteen years in almost exactly the condition that this patient presented upon entrance. He had been giving some tablets of digitalin, but the heart dilated meanwhile until the dulness over the left auricle reached the second rib at the time of my visit. We decided that the drug given was utterly inefficient, and substituted the infusion, as in this case, and with even a more striking result, the pulse falling from 155 to 94 during the first day, with corresponding improvement in every way.

The prognosis here is more grave than in any other of the four cases, for the disease is already far advanced, and growing patients

are less favorable in this regard than adults. Her heart will again break down, undoubtedly, and eventually the hypertrophy will give way to the increasing dilatation, and she will die, as most of these mitral cases do, bedridden, with extensive dropsy.

Since the symptoms are much alike in the two varieties of mitral disease which we consider, and the heart dulness increases transversely in each, with accentuation of the pulmonic second sound, we depend for the differential diagnosis chiefly upon the murmur and the thrill. In stenosis presystolic murmur and frequently thrill are found within the nipple or near it; in regurgitation systolic thrill is rare, but systolic murmur is heard near the apex, transmitted to the left, and frequently to the back.

ANÆMIAS OF INTESTINAL ORIGIN; REPORT OF A FATAL CASE, WITH AUTOPSY.

READ BEFORE THE UPPER MAUMEE VALLEY MEDICAL ASSOCIATION.

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GENTLEMEN,—My purpose in presenting this subject is to call attention to the importance of intestinal disease as a frequent cause of severe grades of anæmia. This is by no means a new point of view. Certain French clinicians long ago reached the conclusion that constipation was the common cause of anæmia.[1] Sir Andrew Clark has recently adopted the same views.[2] Something more than ten years ago Dr. Hunter thought that he was able to trace a parallelism between the histologic condition of the blood in so-called idiopathic pernicious anæmia and that experimentally produced by the poisonous action of toluylene,[3] and concluded that the remarkable hæmolytic processes characteristic of pernicious anæmia were the results of certain cadaveric poisons produced in and absorbed from the gastro-intestinal canal. Numerous other observers reached similar conclusions. For instance, the influence of intestinal parasites in the production of this disease was dwelt upon, and illustrative cases reported, by Podvysowtzki in 1888, and more recently by Shiperovitch and Vlayeff, each of whom reported cases of progressive pernicious anæmia caused by the bothriocephalus latus. A few years ago the late William Pepper[4] reported a case of pernicious anæmia

[1] Among comparatively recent opinions, see Charbut, Etude Critique de l'Anémie pernicieuse progressive, Paris, 1889. There is recognized by authors quoted a distinct group of cases designated "anæmia progressive gastro-intestinal," p. 6; also Osler, loc. cit., p. 727.

[2] Stephen Mackenzie, Lettsomian Lectures on Anæmia, in Transactions of the London Medical Society, 1891, p. 196.

[3] Stephen Mackenzie, loc. cit., p. 196.

[4] Philadelphia Medical News, 1895, lxvii. p. 573.

due to ileocolic disease, while Marcorelli in 1890 reported other cases resulting from chronic gastro-intestinal catarrh. In a somewhat recent monograph by Agnoli, of Lima, Peru, he quotes with approval the opinion of Birch-Hirshfeld, Lusana, Runeberg, F. Miller, Moosebergher, and others, that the pernicious anæmias caused by intestinal parasites (especially tricocephalus, bothriocephalus, and anchylostomum) are not the direct result of their presence or of the abstraction of the blood by them, but of toxines formed by them and taken into the circulation. These points are selected from comparatively recent literature to show the frequency with which grave anæmias have been attributed to gastro-intestinal and especially intestinal disease.

The following case is selected from among those recently occurring in my practice, and has an especial interest along these lines.

Mr. X., farmer, aged thirty-five, married, had two children; referred by Dr. Z. H. Stamets, April 6, 1898; present illness had lasted twenty-one weeks.

Personal History.—For nearly ten years he had been troubled with a distress or feeling of fulness in the lower part of the abdomen. He has always had more or less backache, and had been troubled with habitual constipation. For two or three weeks before the present illness began he felt weak and not able to do his usual work. He had six or eight chills, which generally came on during the night. The abdomen became very much "bloated." The distention was extreme and resulting pain severe. His tongue was heavily coated and breath excessively offensive. During this time the alvine discharges contained large quantities of mucus. This lasted altogether about three weeks. For some days the dejections were almost pure mucus, which was in large massive shreds.

About thirteen weeks after the illness began there appeared a severe, left-sided, typical sciatica, lasting three weeks. When Dr. Stamets was called he found a temperature of 103° F., with considerable tympanites, and says that "the stools contained mucous, purulent material" and a little blood. In three weeks the temperature dropped to 99°.

On examination I found a well-developed man of good physique and fairly rounded form, with little or no emaciation, but intensely anæmic. The fingers and finger-nails were of an ashy color, and no perceptible blushing of the surface could be produced by pressure.

He was unable to walk across the room, and constantly complained of shortness of breath. Further questioning in regard to bowel conditions elicited the fact that he had been troubled for years with excessive formation of intestinal gases, and headache after eating his principal meal. Physical examination revealed practically nothing of importance except localized tenderness in certain areas of the abdomen, most marked over the region of the cæcum and in the hypogastrium, and extreme tympanites. The spleen was perhaps slightly enlarged; the liver of normal size.

Ophthalmoscopic examination showed numerous retinal hemorrhages, some old, others recent.

General toxæmic pains in all parts of the body were constant and troublesome.

Urinalysis.—The total quantity of urine passed in twenty-four hours was 1625 cubic centimetres; transparency normal; odor strongly urinous; color quite dark; specific gravity 1010; total solids $2\frac{1}{3}$ per cent., or about 39 grammes, or 585 grains; reaction acid; acidity 40 degrees; urea 1.8 per cent., or 29.25 grammes, or 443 grains; uric acid .045 per cent., or 73 centigrammes, or 11 grains; no albumen or sugar; chlorides within normal range; total phosphates .75 per cent., or 12 grammes, or 3 drachms, in twenty-four hours; marked indicanuria, ranging from .01 to .02 of one per cent.; no peptone or acetone. Microscopic examination with centrifuge was entirely negative. A quantitative estimate of the iron excreted in the urine was made by Dr. L. P. Drayer, city chemist, showing for one day .029 per litre, or about .04 for twenty-four hours,—*i.e.*, a great excess.

The history of abdominal symptoms strongly attracted my attention to the digestive tract, and I proceeded to make a thorough investigation of the intestines. The alvine discharge was large in quantity, semi-fluid in consistence, and brownish yellow in color, with a distinct, unevenly distributed tinge of green throughout, due, it was found, to chromogenic bacteria. It was extremely offensive and filled with bubbles of fetid gas.

Cover-glass preparations showed myriads of Nothnagel's butyricum clostridium. As would be expected, the fields were filled with bacteria, rod-shapes predominating, the bacillus coli communis existing in large thick clusters in the form of pure cultures.

The water obtained from washing out the colon contained in ad-

Unidentified microscopic tænia from twenty-five to fifty times smaller than tænia nana.

dition to some fecal matter innumerable fine particles of grayish color, some of which appeared like fragments of calcareous matter. These were heavy and rapidly settled to the bottom, forming a dense layer an inch or more in thickness. This deposit was treated with hydrochloric acid and chloroform, but was insoluble, and stained deeply with gentian violet. Microscopically it was found to be composed, first, of large numbers of epithelial cells, many of which were in an advanced stage of fatty degeneration. Considerable numbers of a very interesting species of protozoa were found, measuring about one hundred micromillimetres in diameter, consisting of a very delicate faintly outlined capsule, containing a colorless and nearly structureless protoplasm, with a very large granular nucleus, taking a faint orange G stain.

Small mucous shreds were plentiful, and also a few leucocytes; but besides these there were myriads of a microscopic parasite belonging to the tænia group. After repeated washings and decantations a deposit was obtained consisting almost entirely of these parasites, the quantity of which was incredibly large. The individual segments averaged three-tenths of a millimetre in length and two-tenths in breadth, and were somewhat broader at the centre than at the extremities. The segments all had a distinct reddish tinge, deeper in some than in others. Although commonly single, frequently two, three, and occasionally as many as six or eight segments were found united. Although many slides were examined, no head segment was found. A large collection was set aside in my laboratory with the intention of making a prolonged search for a head segment when there was more leisure, but when the leisure came they had undergone disintegration. The ova were present in enormous numbers.

I was entirely unable to identify the parasite. It has much similarity to the tænia nana, or dwarf tapeworm, which is said by von Siebold to be the smallest tapeworm found in man; but the latter is said to vary from eight to twenty millimetres in length, thus measuring from twenty-five to fifty times more than the parasite found in this case.

Examination of the blood on April 7, 1898, showed it to be in color dark and venous looking; a drop was obtained with great difficulty after constriction of the finger for several minutes; specific gravity 1040 by Hammerschlag's method, indicating about forty per

cent. of hæmoglobin; centrifugal examination showed fourteen and one-half per cent. of red cells and a fraction over one per cent. of white, indicating a blood count of 1,450,000 red and about 120,000 white cells. The centrifugated serum was of normal color. A blood count made at this time by Dr. Drayer gave the number of red cells as a little more than one and one-fourth millions and the ratio of the white to the red as one to nine. At the same time he estimated the hæmoglobin with Fleischl's instrument at thirty-eight per cent.

In cover-glass preparations the number of white cells apparently closely corresponded with the centrifugal estimate. They took the Ehrlich stain well. A differential count limited to one hundred and forty white cells gave neutrophiles one hundred and fifteen, small lymphocytes twenty, large lymphocytes five, myelocytes one (?). There were a few macrocytes, measuring from ten to twelve micromillimetres in diameter. A number of normoblasts were found, but no megaloblasts. There was a moderate poikilocytosis.

On the ground of a positive history of gastro-intestinal disease, the microscopical demonstration of an intense colonic infection, bacterial, protozoal, and parasitical, and the microscopic findings in the blood, I made the diagnosis of secondary anæmia of intestinal origin, and instituted treatment accordingly. This treatment consisted of daily antiseptic flushings of the colon, with abdominal massage, coupled with fifteen-grain doses of benzonaphtol about four times per day, which latter was later alternated with guaiacol, creosote, and other antiseptics. Both iron and arsenic were exhibited throughout the case. General massage and general tonic, electrical treatments were also carried out systematically. Oxygen inhalations were also administered daily—five or six gallons—for several weeks.

The condition of the alvine discharges and colonic washings showed continuous improvement in the local conditions. The fetor diminished and the microscopic evidences of infection became less and less. Very slowly, but still perceptibly, there was improvement in the blood conditions, as shown both by superficial appearances of nail-beds and by blood examinations. The red cells gradually increased in number until in five weeks the count showed 2,225,000. At this time external signs of improvement were very noticeable. The nail-beds on the slightest pressure showed a distinct pinkish color, which it was impossible to produce at first. A similar coloration, less in degree, could be produced on the ends of the fingers.

The general pallor, while still great, was observed by myself and commented on by members of his family as not being so extreme.

During this time the leucocytosis had gradually disappeared. No actual count of white cells was made, but the centrifugal layer became invisible, and the cover-glass preparation showed the leucocytes to be within normal range.

The patient left the hospital in about three weeks, the improvement continuing for several weeks longer. At this time the sciatic pain reappeared, and also an intense pain and soreness localized in the adductors of left thigh, possibly a toxic myositis. This pain became worse and worse, destroying appetite and preventing sleep, and rapidly turned the scale against the patient. Death from inanition followed a few weeks later. The fatal issue was undoubtedly determined by the prostrating effects of the intense sciatic pain, as improvement was marked up to the time of the return of this complication.

An autopsy was made thirteen hours after death by Drs. Z. H. Stamets, F. M. Hines, and others. The autopsy notes were made by Dr. Hines, from whom and Dr. W. F. Shoemaker I obtained a report. The lungs, heart, liver, spleen, and kidneys were normal, so far as naked-eye appearances would indicate. There was evidence of severe intestinal catarrh involving the entire colon and a considerable portion of the ileum. The pancreas was normal in size, form, and position, but was considerably indurated and surrounded by adhesions, which bound it firmly to the posterior abdominal wall and adjacent organs, the evident result of old inflammatory processes.

This case presents many points of interest bearing upon the general subject of anæmia and especially upon the particular topic of this paper. In some of its features, and especially in the absence of marked emaciation, its malignancy, increased iron excretion, high color index, and retinal hemorrhages, it bears a close correspondence to the commonly received standards of so-called idiopathic pernicious anæmia; but here the parallelism ceases and divergences begin.

First as to the absence of emaciation. The retention of subcutaneous fat is not at all peculiar to idiopathic pernicious anæmia, but is found in chlorosis (in which it is sometimes even increased) and in some obviously secondary anæmias. The daily output of 29.25 grammes (450.3 grains) of urea and .73 gramme (11.26 grains) of uric acid (a ratio of 40 : 1) is not only within the limits of health,

but strikingly near the physiological standards. The fault was apparently not in the metabolism of proteids. With regard to the carbohydrates and fats I can only say that with a liberal mixed diet there was no stomach distress after meals, and that there was neither lipuria nor fatty stools, proving that the fats were disposed of in the normal manner. About twenty complete examinations of colonic contents and twenty-four-hour collections of urine were made during my observation of the case. In the fecal matter there were many grayish-white particles which macroscopically might have been mistaken for fat, but repeated microscopical and chemical examinations proved them to be something else.

We must conclude, therefore, that the general nutrition of the body, as indicated by the gross metabolic processes, was in a phenomenally good condition, considering the circumstances of the case, and really fair for a person in ordinary health.

With regard to the single feature of malignancy, it is not entitled to great weight in the differential diagnosis between supposedly primary and secondary types of anæmia.

The increased iron excretion in the urine is a point of much greater importance. Let us carefully consider its significance. The data are meagre. Hunter says that the normal excretion in health averages .0056 gramme, or one-tenth grain, in twenty-four hours, while in pernicious anæmia it averages .0322 gramme, or one-half grain, and in chlorosis .0017 gramme, or one-fortieth grain. In this case a single estimation (May 7) showed about .4 gramme, or six grains,—a tremendous increase. What is the explanation of this large iron excretion in pernicious anæmia or, in fact, in any other condition? There is only one answer. It means excessive hæmolysis. This is illustrated in the comparative iron excretion of chlorosis and pernicious anæmia above quoted. In chlorosis the blood-cells are not destroyed; the count is relatively large, four million or more, while the individual value of the cells in hæmoglobin, which is almost the same as saying in iron, is very small; in pernicious anæmia, whether secondary or otherwise, hæmolysis is usually excessive, the red cells are rapidly disintegrated, and their constituent iron is eliminated in the urine. In chlorosis both hæmogenesis and hæmolysis are inactive; in pernicious anæmia and allied anæmias both hæmogenesis and hæmolysis may be active, the latter being excessive and more than counterbalancing the active hæmogenetic

function. As Ehrlich has most graphically expressed it, "Degeneration and regeneration course side by side in uncomplicated anæmia, and it depends upon one or the other process whether this simple anæmia ends in a cure or in the progressive pernicious form."

There is at least good ground for empirically assuming that bacterial ptomaines and proteids of intestinal origin may have a direct action upon the red cells, destructive in character, thus accounting at once for the excessive hæmolysis and resulting excessive iron excretion. One fact supporting this view is found in the circumstance, dwelt upon by Stephen Mackenzie,[1] that the evidences of excessive hæmolysis in cases of so-called idiopathic pernicious anæmia are found especially in the portal circulation and increased iron pigmentation of the liver. If this does not mean that the necrobiotic process going on in the red cells of the portal circulation is due to some materies morbi from the gastro-intestinal tract, what does it mean? According to Hunter, the hæmolytic processes of idiopathic pernicious anæmia are principally limited to the portal circulation, and this fact—which is, I think, generally accepted[2]—points with no uncertain finger to the gastro-intestinal tract as the source of the anæmia when those conditions are met with,—points, in short, to the secondary character of all such cases of so-called idiopathic pernicious anæmia.

The color index appears to be somewhat high in this case,—viz., about 1.25. This increased color index is said to be somewhat characteristic of pernicious anæmia, and yet Cabot tells us that in thirty-four cases of pernicious anæmia the color index was less than 1 in twenty-one cases and more than 1 in thirteen cases. Apparently a low color index is found somewhat more frequently than a high one, if we may judge by this series of cases. There was one phenomenon presented in this case which I do not remember seeing mentioned, and which, it seems to me, must still further obscure the significance of color index and render still more unreliable the already much questioned color methods of hæmoglobin estimation. I refer to the dark, venous-looking character of the drop, instead of the frequently pale and watery color, which is not, of course, due to increased

[1] Stephen Mackenzie, loc. cit., p. 168.

[2] Stahl, Quincke, Peters, Rosenheim, Mott, Kobert, Cohn, and Glaveck, quoted by Mackenzie, loc. cit.

hæmoglobin but to defective oxidation. Such a condition, it would seem, cannot do otherwise than raise the color index.

I am using Gower's hæmoglobinometer, on the recommendation of Vierordt, who regards it as much more reliable than Fleischl's apparatus; but I confess to a strong feeling of uncertainty as to when I have made exactly the proper degree of dilution, and regard the result as only roughly approximate. With all these uncertainties hanging around the subject of color index, its reliability as a diagnostic sign cannot be great.

The differential count of white cells reveals a condition entirely discordant with the accepted descriptions of the blood in so-called idiopathic pernicious anæmia. For instance, in an analysis of thirty-four cases Cabot found that large and small lymphocytes averaged 45.9 per cent. of the entire number of white cells, about nine-tenths of these lymphocytes being of the small variety.

In this case the lymphocytes and neutrophiles were in about normal proportion. The character of the white cells, therefore, indicated a leucocytosis entirely physiologic in its proportions.

Furthermore, leucocytosis is said not to exist in pernicious anæmia except temporarily as the result of some complication, a marked leucopœnia being the rule, the white cells falling as low as four hundred in one reported case. In my case the obvious cause of the leucocytosis was found in intestinal conditions, the history showing that they were of very long duration. Moreover, leucocytosis has been experimentally produced by Buchner[1] by the introduction into the circulation of certain pyogenetic bacterial products. Leucocytosis is also recognized as a pretty constant condition in many infectious states, in which it is presumably the consequence of the pathogenic bacterial products. With these experimental and clinical facts before us, considered in their relation to this case, I think we are fully warranted in attributing the remarkable leucocytosis found to chemical products of some of the numerous varieties of bacteria present in the intense mixed colonic infection.

In the associated intestinal infection and resulting toxæmia we have that which, in my opinion, in the light of experimental research and clinical observation, we are entirely justified in regarding as the adequate cause of the anæmia. The notable improvement as intestinal asepsis was gradually and partially accomplished, amount-

[1] Vaughn and Novy, Ptomaines, Leucomaines, etc., Philadelphia, 1896, p. 193.

ing to an increase of more than fifty per cent. in the number of red cells, and the disappearance of the leucocytosis, presumably as a result of the disappearance or greatly diminished quantities of chemotactic bacterial products poured into the blood, furnish the strongest kind of corroboration of this view of the case. The increase in red cells and diminution in white proceeded *pari passu* with improvement in the intestinal condition, and was only arrested when the intense thigh pain returned. His anæmia, though vastly improved, was still grave, there being less than fifty per cent. of the normal number of red cells, and, enervated by more than six months of overwhelming toxæmia, he was in no condition to withstand a disease like sciatica, with possibly a complicating myositis, that frequently taxes the vitality of strong and vigorous patients to the utmost.

In considering the significance of a hardened condition of the pancreas we must remember that it is sometimes indurated without being diseased. Osler says,[1] "Normal conditions of the organ must not be mistaken for disease. It is often hard and with very distinct lobulation." In view of these facts we will have to be cautious in drawing conclusions from simple induration, unsupported by microscopic examination, which was made impossible by refusal of permission to take specimens.

The functional integrity of the pancreas in this case is supported by clinical evidence which is very nearly if not entirely conclusive. I have already dwelt upon the absence of pathological quantities of fat in the stools, a fact verified repeatedly by chemical and microscopic research. The absence of both glycosuria and lipuria was also proved by numerous examinations.

Now, the well-known experiments of Mering and Minkowski, together with clinical observations, warrant the conclusion that complete destruction of pancreatic function invariably causes glycosuria. Its entire absence in this case, strengthened by the absence of lipuria and fatty stools, would furnish conclusive evidence of the integrity of pancreatic function. I am quite well aware that, as a rare exception, the bile may in the absence of pancreatic secretion so far transform the fat as to permit of its absorption, thus preventing fatty stools. But no other function could vicariously replace that of the pancreas in the prevention of glycosuria, and the probably imperfect biliary transformation of fats would favor lipuria. The absence of

[1] William Osler, Practice of Medicine, p. 492.

the extreme emaciation so characteristic of severe pancreatic disease, and constantly present in Mering and Minkowski's experiments, might be cited as further proof of the functional activity of the gland.

There is no sufficient reason to suppose that either the pancreatitis or surrounding peritonitis bore any direct relationship to the fatal anæmia in this case. These structures are not directly concerned in the blood-making function, and the most that they could do would be to impair digestion and thus favor the intestinal infection, which was, I am fully convinced, the efficient cause of both the oligocythæmia and the leucocytosis. That they were contributing factors, as any morbid process disturbing the general health would certainly be, may be freely admitted; but there are good and sufficient reasons to regard them along with the anæmia as co-results of the primary intestinal disease, the etiology of which is remote in time and obscure in character.

I desire especially, however, to call attention to the probable importance of the parasites, identically the same form having since been found in two other cases of moderately severe anæmia, which pursued a favorable course with their elimination and, of course, other appropriate treatment. I have already cited a number of observers who attribute to the chemical poisons formed by various intestinal parasites—poisons perhaps analogous to the ptomaines of bacteria—a very important *rôle* in the production of grave anæmias. In view of the considerable number of cases of pernicious anæmia reported as caused by intestinal parasites, the immense number of these organisms present in this case can be fairly regarded as a probably important factor, along with the bacteria, in its etiology.

There is good reason for believing that, owing to the technical and æsthetic difficulties encountered in a scientific investigation of intestinal contents, adequate causes of grave anæmias are frequently overlooked in this location; and that, consequently, many a case recorded as idiopathic would find in this field of research a demonstration both of its cause and secondary character. It is not supposed for a moment that the cause of all cases of pernicious anæmia will be found in intestinal infections. Yet it is extremely significant that the destructive blood changes as described in this group of cases are largely limited to the portal circulation, where morbid influences can scarcely come from any other source than the gastro-intestinal

tract. Furthermore, this portal hæmolysis constitutes by far the most important factor of the disease. The fatal tendency in pernicious anæmia is due to this excessive hæmolysis more than to anything else, if not to this alone.

It appears to me that in so-called pernicious anæmia the evidence is in favor of the view that the primary change, in so far as it concerns the blood mechanism, is limited to the blood-cells, and that the marrow changes are secondary. This view is held by Eichhorst, Paechtner,[1] and others. It seems to be a well-established fact that hyperplasia of the bone-marrow occurs in forms of anæmia unquestionably secondary in character, and can fairly be regarded as an effort to meet the excessive hæmolysis by a compensatory hæmogenesis.

Conclusions.—1. Many cases of grave anæmia, pernicious in type, have their cause in toxæmic states resulting from gastro-intestinal disease.

2. The fact that the hæmolytic process recorded in cases of so-called idiopathic pernicious anæmia has been shown to occur principally, if not exclusively, in the portal circulation is very nearly conclusive proof of the gastro-intestinal origin of all cases in which this phenomenon occurs.

3. The cause of this excessive hæmolysis is presumably a group of poisons, as yet unidentified, resulting from the growth of bacteria, parasites, or, possibly, protozoa.

4. This explanation is accepted for a large contingent, but by no means for all, of the cases of so-called idiopathic pernicious anæmia; for the remainder other causes exist, but still for the most part probably outside the hæmatopoietic organs.

5. The evidence so far tends to prove that in most, if not in all, pernicious anæmias, and especially in those of the so-called idiopathic type, hæmogenesis—and, therefore, the integrity of the hæmatopoietic organs—is unimpaired or excessive, indicating an attempt to compensate the excessive hæmolysis which constitutes the essential feature of the disease so far as the blood is concerned.

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[1] W. Paechtner, Ueber progressive perniciöse Anämie, Würzburg, 1894, S. 29.

SKIN-GRAFTING; INTRAGASTRIC ELECTRIZATION; INTRAVENOUS INJECTION.

AN ADDRESS TO THE COUNTRY PRACTITIONERS.

BY JAMES F. RINEHART, M.D.,

Member of the Kentucky State Medical Society, Springfield, Kentucky.

Gentlemen,—There are many procedures in medicine and surgery which, upon first thought, seem to the general practitioner to be beyond his power to use, and hence, for the lack of a little self-confidence, are never attempted by him, when in reality they are easy of application and need only to be tried to be more commonly adopted.

It is to illustrate some of these and at the same time to impress upon you their simplicity that I beg leave to report the following cases.

Case I.—Mrs. H., aged forty, was thrown from her buggy and dragged for some distance over a macadamized turnpike, her head striking a paling fence several times. The skin over the forehead and cranium was cut and torn in various directions, from a line parallel with and just beneath the eyebrows to a point two inches in front of the crown. The skull was stripped of its periosteum in several places, the largest being of the size of a silver fifty-cent piece.

The wound was cleansed as thoroughly as possible of the dead leaves, dirt, and gravel which had been ground into it, and the edges of the cuts were as well coapted as could be done. The lines of sutures presented very much the appearance of crazy-quilt work, so numerous were the cuts.

As I expected, there was a triangular area of skin, with its base between and involving a small part of each eyebrow and its apex in the middle line two inches higher up, which was so bruised that it lost its vitality entirely and had to be removed. To prevent cicatricial contraction and to hasten the healing of this denuded area, I

proceeded as follows: the denuded surface was thoroughly cleansed each day with a warm carbolic acid solution, dusted lightly with iodoform, and dressed with iodoform gauze and cotton, until the bone had become covered with granulations and the wound had become level with the surrounding skin. The wound by this time was filled with small hard granulations, and suppuration had almost ceased. Following the suggestion laid down in the "American Text-Book of Surgery" under "Thiersch's Method of Skin-Grafting,"—that there are two layers of capillary vessels in granulation tissue, a superficial vertical layer springing from a horizontal layer just underneath, and that this superficial layer is capable of contraction which may be sufficient to disturb the grafts,—the surface of the wound was scraped with a sharp knife and all oozing checked by pressure with cloths wrung out of hot water before any grafts were applied.

Skin-grafts were then cut and applied as follows: the arm was scrubbed with soap and hot water and rinsed with sterilized water. A fold of skin was then taken up between the thumb and forefinger, and with a razor sections of skin were shaved off in sizes varying from a split pea to a nickel, and of sufficient thickness to make a mere oozing of blood from the site of their removal. These were placed over the wound only a little distance apart, the cut surface next to the granulation tissue, and their edges smoothed down to prevent curling under. Over this was placed a layer of gauze large enough to extend a little way beyond the edges of the wound. This was securely fastened to the healthy skin with collodion. Over this were placed other layers of iodoform gauze, held in place by cotton and a bandage. When the wound was dressed, which was done the third day, the cotton and outer layers of gauze were removed, leaving in place the first layer, which had been fastened over the grafts as described above. Through this the wound was washed with warm salt water, one drachm to the pint, and cleansed of all pus and serous discharge. Another dressing was put on, which was removed on the seventh day from the time the grafts were applied, when it was thought advisable to remove carefully the inner dressing as well. The grafts were found to be firmly united.

Case II.—G. L., aged twenty-four, had been a great sufferer, and had been in the hands of several physicians who had treated him for dyspepsia with very little if any benefit. From my case-book I take the following notes of his condition and of his treatment.

Tongue coated, papillæ red. Throat pale red and boggy. Patient fairly well nourished. He complains of continuous burning in his stomach, with colicky pains in the stomach and bowels. Has from three to seven bowel movements per day. Has suffered more or less from diarrhœa in this way for the past four years. Several members of his immediate family died of consumption. There is tenderness over the epigastrium. The diagnosis was chronic gastric catarrh and hyper-sensitive condition of the mucous membrane of the stomach and bowels, with faulty gastric and intestinal innervation. Treatment began with twenty drops of liquid hydrastis before meals, a teaspoonful of compound syrup of the hypophosphites after meals, and a tablet containing charcoal, pepsin, and subnitrate of bismuth every four hours. The hydrastis was given for its effect upon the mucous membrane, the hypophosphites to bring about a better condition of nerve force, and the tablets for their digestant, soothing, and antifermentative effect. The result of this treatment was nothing. Lavage was then tried and antacids were given, with the hope that this might be a case of hyperchlorhydria with resultant irritation, but with no effect.

Still clinging to the idea that there was some defect in the nervous supply through the sympathetic, the following treatment was given. An electrode, made of a stomach-tube through which was passed a small wire coil with an olive point attached, was introduced into the stomach, which had been previously filled with water. To this was attached the negative pole of a galvanic battery. The positive pole was then attached to a sponge electrode, which was applied after the manner of Einhorn, first below the ensiform cartilage, then over the gastric region from point to point, then over the back to the left of the seventh dorsal vertebra, then to the front again, the current being gradually increased and then gradually diminished in force, from fifteen to twenty milliamperes being used and the sitting lasting eight minutes in all. This treatment was used every three or four days for a month, and then once a week for a month longer. The improvement was marked from the beginning. The case has now gone two years without a return of the trouble.

The value of intragastric electrization seems to be unquestioned, although the explanation of its good effects seems to be as yet a matter of doubt. The rules for the therapeutic application of intragastric electrization as laid down by Einhorn are practically as follows: For

gastric dilatation, relaxation of the cardia (with eructations), relaxation of pylorus (with regurgitation of bile into stomach), the use of gastro-faradization is indicated. For gastralgias and chronic gastric catarrhs with little secretion of mucus, gastro-galvanization is especially useful. The application of this treatment is exceedingly simple. The electrode spoken of above has been objected to, upon the ground that the current is apt to be spent on one particular part of the stomach should the olive point of the electrode come in contact with some part of the mucous membrane. This can be obviated to a large degree by having the stomach full of water, which will distribute the current evenly to all parts of the organ. It is easy of introduction, and can be used by any one who knows how to introduce the stomach-tube, an advantage over the deglutable stomach electrode of Einhorn.

Case III.—While the use of the measure to be herein described might not have been thoroughly justifiable in the case in which it was used, still it serves to illustrate fully the restorative effects of the remedy and gives an opportunity to describe its method of administration and the indications for its use. I speak of intravenous injection of saline solutions. The case in point was one of pneumonia in which the patient was dying of septic intoxication. It was about the eighth day of his disease, and he had gone into a condition of collapse, induced, I am sure, more by his profoundly septic condition than by any cardiac failure or extensive lung involvement. By this I mean that, if there had been no unusual virulence of the microbic poison, no effect of this poison upon the nervous system more than is ordinarily seen in a case of pneumonia in which there is a favorable ratio between the toxine and antitoxin, the mechanical obstruction to the respiration and circulation was not sufficient to have caused collapse.

Reasoning in this way, I determined to use intravenous injections, hoping to increase the elimination of toxines by the skin and kidneys, to support the patient, and thus give the system an opportunity to counteract the remaining poison by its own antitoxic powers.[1] Whether my reasoning was correct or not must, of course, remain, as yet at least, a matter of doubt; but the effect shown in this case was one to be desired in many cases of the kind,—viz., com-

[1] See Antitoxin Treatment of Pneumonia, A. H. Smith, American Journal of the Medical Sciences, October, 1898.

plete restoration to consciousness, restoration of the secretions of both skin and kidneys, and filling up of a pulse which had hitherto been imperceptible. Five pints of warm salt water were used. For two or three hours the patient was wonderfully improved. Indeed he seemed to be on the high-road to recovery. After that time, however, his pulse gradually weakened, his former condition returned, and he died.

The advantage of this treatment, even in its effect of restoring consciousness alone, is obvious. The method of using the injection is as follows: a solution of common salt, one drachm to a pint, or, as preferred by Hare,[1]

℞ Calcium chloride, 0.25 gramme (grs. $3\frac{3}{4}$);
Potassium chloride, 0.1 gramme (grs. $1\frac{1}{2}$);
Sodium chloride, 9.0 grammes ($\overline{3}ii\frac{1}{4}$);
Sterilized water, q. s. ad 1 liter (Oii),

is to be warmed to 100° F. and injected into the median basilic vein by means of a fountain syringe. The fountain syringe should be filled with the solution, a glass tube should be attached, and to this a smaller rubber tube into which is fitted a metal canula. The vein is dissected up, a probe is passed under it, and around it is passed a silk thread. The water is allowed to flow from the syringe, and while it is flowing the canula is passed into a small opening made in the vein. The thread is tightly tied around canula and vein to prevent the entrance of air. The glass tube should be watched to see that no air bubbles are forced down by the column of water in the tubing above. This is not likely, however, to occur, though it is possible in the first few seconds. If any bubbles are seen to come down, the smaller tube should be immediately grasped by the thumb and finger to prevent their being forced into the vein.

The technique is simple, and with proper precautions the operation is safe. The indications for intravenous injections are hemorrhage, defective kidney elimination and resulting coma, and, according to the French physicians, the profound toxic conditions which result from scarlatina, erysipelas, etc.

[1] See Therapeutic Gazette, July, 1898, p. 440.

Neurology.

PARALYSIS OF ISOLATED BRANCHES OF OCULAR NERVES PRODUCED BY TRAUMA; OBSTETRICAL AND OTHER BRACHIAL PLEXUS PARALYSES.

CLINICAL LECTURE DELIVERED AT THE MASSACHUSETTS GENERAL HOSPITAL.

BY G. L. WALTON, M.D.,

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PARALYSIS OF ISOLATED BRANCHES OF OCULAR NERVES PRODUCED BY TRAUMA.

Gentlemen,—The first case I have to show you to-day is that of a boy nine years of age, who has partial ptosis of the left lid. This followed a blow received from a base-ball six months ago. The ball, an ordinary one, had been thrown into the air, not particularly high, and in its descent struck him over or near the left eye, the face being upturned. He paid no attention to the accident at the time, no pain followed, either directly or after an interval, and no further attention would have been paid to the occurrence if the drooping of the lid had not supervened. Just how soon this symptom appeared we do not know; it was first called to his attention by his mother on the evening of the accident or the next morning. There was no double vision, no change in the pupils observed by the parents, no malaise, headache, or other symptom. The condition has remained constant up to the present time.

The drooping of the lid is at once evident to the observer; the eyeball is not entirely covered, but the lid falls enough to cover an appreciably greater part of the cornea than does the lid of the other eye. Efforts on his part to open the eye widely are unavailing, though no mechanical resistance is offered to my raising the lid.

There is no thickening of the tissues, no œdema, no prominence of the globe, nor other evident structural defect.

We are left, then, with an isolated paralysis of the branch of the superior division of the third nerve which supplies the levator palpebræ. The history practically assures us that this paralysis was caused by the blow described; still, to avoid any mistake due to the bare possibility that this was a congenital defect, first noticed at the age of nine, I have requested the father to bring photographs of the patient taken before the accident. From these you will see that both lids were held open perfectly and alike.

Paralysis of isolated branches of the ocular nerves is not uncommon. The course of these nerves through the sphenoidal fissure renders them peculiarly liable to pressure from exostosis or the results of inflammation, and the most common form of paralysis within the orbit is the so-called rheumatic variety; it is also occasionally secondary to adjacent cellulitis (Gowers). The onset of the paralysis in these inflammatory forms is usually quite rapid, and may or may not be accompanied by dull pain in the temporal region. The traumatic form is, as a rule, characterized by sudden onset following a blow upon the brow, cheek, or temple. It is an almost invariable rule that sudden onset of symptoms indicates vascular disturbance, and the pathology of these cases probably comes within the rule, though we are precluded in the nature of things from absolute knowledge of the process. In case the paralysis is accompanied by visible extravasation about the eye, we may be fairly certain that the nerve injury is due to compression from hemorrhage in the course of the affected nerve branch through the orbit, probably into the nerve sheath. Extravasation is, however, generally absent, as in the case of this young man, and in such cases the injury is probably due to an extremely limited hemorrhage in the sheath. Paralysis of the palpebral branch of the oculo-motor nerve is perhaps the most common result of this form of trauma, though this distinction may be disputed by the abducens, whose long course from the junction of the pons and medulla along the base of the brain and through the sphenoidal fissure renders it peculiarly liable to every variety of pressure, even including that from far-distant cranial tumors.

These traumatic paralyses, while not often coming under the observation of the general practitioner, are by no means uncommon from the point of view of the oculist, and such cases occasionally

Fig. 1.—Partial ptosis of left lid, produced by blow from base-ball.

drift into the neurological department. You may, then, never meet one in your practice, but the subject is of sufficient importance to call to your attention, even if for no other reason than to preclude your making the diagnosis of nuclear disease or basal meningitis, lesions which immediately suggest themselves in cases of diplopia, ptosis, or other ocular disturbance.

Dr. Cheney has kindly given me the notes of several of these cases. He is to report them later in detail, together with his views of the pathology, but a *résumé* of the salient points in the cases will be of interest.

The case in Dr. Cheney's collection most resembling ours is that of a girl thirteen years of age. About a week before visiting the infirmary she received a blow under the left eye from a small stick. Within a few hours the left lid began to droop, and soon complete ptosis was established. No other trouble appeared. The vision, the pupils, and the movements of the globe were unimpaired. The only external sign was a slight discoloration at the centre of the lower border of the orbit, without pain or tenderness. The ptosis began to improve in a week.

A case with more serious results was the following: A boy of thirteen was thrown over and struck the region of the left eye upon a car rail. Unconsciousness supervened, followed by complete blindness, and paresis of all the ocular muscles, including the levator palpebræ. The pupil was dilated and did not react to light or accommodation. There was extravasation into the lids and under the conjunctiva, but no bleeding from the ears or nose. Ten days later the ptosis had practically disappeared, and the movements of the globe were nearly normal excepting inward rotation; there was slight deviation. The blindness persisted. Dr. Cheney considers the lesion in this case to have been hemorrhage, with or without fissure of the roof of the orbit, involving the optic foramen.

The third case reminds us that suppuration sometimes follows in these cases, causing progressive symptoms, in marked contrast to the stand-still or retrogression to be expected after simple hemorrhage. The patient in this case was a boy fifteen years of age, seen at the Massachusetts Charitable Eye and Ear Infirmary. Two weeks prior to his entrance he received over the left eye a sharp blow from a stalk of rhubarb. There was considerable pain directly after the injury, but this soon ceased, and nothing was noted till the following

day, when drooping of the upper lid was observed, with some redness of the eye. The redness disappeared in a few days, but the ptosis persisted. Seven or eight days after the injury prominence of the left eye was noted. Examination showed complete ptosis and marked exophthalmos, with displacement of the globe downward. There was limitation of upward movement of the globe. No abrasion, swelling, or ecchymosis was visible; no redness or other symptom that would suggest recent injury. There was no tenderness at any point of the orbital border or elsewhere. The vision was nine-tenths of the normal. The right eye was normal, and the boy in other respects was perfectly well. At the end of three days the exophthalmos had increased, ocular movements were more limited in all directions, and the vision was reduced to less than two-tenths. The ptosis was still complete, but there was no œdema or ecchymosis of the lids, no headache, nausea, or other signs of general disturbance. There was now well-marked optic neuritis, the development of which, in connection with the greater degree of exophthalmos, led Dr. Cheney to explore the orbit. This exploration disclosed a deep pus cavity, evacuation of which resulted in complete disappearance of the exophthalmos within a month, and three months after the operation the vision and fundus had become normal, but the ptosis persisted.

In further corroboration of the fact that oculists are familiar with cases of isolated ocular paralysis following trauma, Dr. Chandler tells me that he has seen the case of a boy who received a blow from a base-ball on the side of the head, with resulting convergence. This symptom persisted several months. He also permits me to mention the case of his own child, a boy of eight, who was thrown from the carriage, striking the malar bone, which was slightly fractured. Convergence was apparent when he saw him two hours later. Recovery took place in ten days.

Dr. Thomson[1] recently reported, at a meeting of the Philadelphia Neurological Society, a case of isolated, traumatic, bilateral paralysis of the abducens nerve. The patient, a man of forty-three years, with no history of specific or spinal disease, had fallen, a year and a half previously, a distance of thirty-three feet. On regaining consciousness an hour and a half later, he found that he had complete bilateral paralysis of the sixth nerve, without sign of fracture of the skull or implication of other cranial nerves. He was able

[1] Journal of Mental and Nervous Diseases, August, 1897.

to return to his work within a few days, but the ocular paralysis remained complete. Dr. Thomson considered the lesion to be a bruise or tear of the nerves in their course from the pons to the sphenoidal fissure.

The results in these cases, taken as a whole, show us that a guarded prognosis must be given as regards perfect cure. In the early stage we can fairly offer hope of absorption of hemorrhage and disappearance of paralysis, but must remember that the effect may remain permanent, at least in some degree, and that during the time immediately following the accident suppuration may ensue and extend the field of damage. In view of the latter possibility, the case should certainly be kept under observation for a time. In our case the time for extension has long since passed, but the chances of recovery from the ptosis are moderate at the best. We shall have reports from time to time, and shall by no means give up hope, for peripheral nerves, apart from the optic nerve, are prone to recover, even tardily, from the effects of pressure.

Gowers states that late extension, perhaps by processes outside the nerves, or cicatricial contraction of adjacent tissue, sometimes occurs. However this may be, I should hardly look for any further trouble in such a case as this, after so long an interval.

Dr. Cheney considers that the lesion in most of these cases is hemorrhage into the sheath of the nerve, resulting from *contrecoup*, the palpebral branch being peculiarly prone to suffer through its contiguity to the roof of the orbit. This is undoubtedly the case here; absorption has taken place, but the nerve has not recovered from the results of pressure. For treatment there is nothing to recommend.

OBSTETRICAL AND OTHER BRACHIAL PLEXUS PARALYSES.

The next case presents a condition with which you are all, unfortunately, likely to come in contact if you have an extensive practice in midwifery,—namely, obstetrical paralysis. No matter how skilful you may become in this branch of practice, you will be unable to avoid this mishap. Such cases were formerly believed to be more or less of a reproach to the accoucheur, and even now such a belief obtains among the laity. Pressure of the forceps, of the blunt hook, of the finger on the neck or in the axilla, or the stretching of an arm was considered the essential factor in its production. In case any

one of these procedures has been required, it is difficult to convince the parents and friends (who are naturally prejudiced by the *post hoc ergo propter hoc* argument) that the accident was due to the efforts of nature and not to those of the accoucheur.

Such cases as the one I have to show you to-day prove one thing with absolute certainty, and that is, that such paralysis *may* occur without any outside intervention whatever.

No physician was present at the birth of this child, and none of the methods above mentioned was used to hasten delivery. The duration of the birth is given as three hours, but beyond this we are able to gather no satisfactory details, except that it was a case of head presentation; of the position we are naturally ignorant. Shortly after the child was born it was noted that the left arm hung helpless, and as the child grew older it became more and more evident that it was unable to use this extremity. You will note, in the first place, the position of the hand; the arm is rotated inward so that the thumb points rather backward, the dorsum of the hand being nearly parallel with the side of the body. The child might, of course, naturally hold the hand in this position, or it might be held there through mechanical processes. The latter factor I eliminate at once by rotating the hand outward myself, a movement to which no opposition is found. The next point to ascertain, therefore, is whether the child *holds* the hand in this position, for example, instinctively to avoid pain, or whether it is *unable* to rotate it outward. It is much more difficult to determine a point of this sort with an infant than with an adult, for in the latter case we simply have to ask the patient to make the movement,—for example, to rotate the hand outward. In the case of the child a little more patience is required. In the first place, the extremity under observation must be placed in various awkward positions, positions from which a healthy child hastens to release it; the control experiment being carried out with the other arm. In this case, when I place the child's right arm in various positions, it is immediately brought back to a natural posture, whereas the left arm retains always this striking position,—namely, with the thumb rotated inward.

It is evident, therefore, that the child is unable to rotate the arm outward; in other words, there is paralysis of the outward rotators of the humerus,—the infraspinatus or teres minor, or both. Looking further among the muscles about the shoulder, we first test the del-

toid. I raise the child's arm from the shoulder and it instantly falls. I raise it several times, and at no time do I feel the slightest effort on the part of the child to hold the arm up. On making this movement with the right arm I can feel the involuntary movement on the part of the child, and placing my other hand on the deltoid I can feel it harden; on my suddenly letting go, the right arm remains in the air. These are the actions of a healthy arm. I will ask you also to watch the left arm throughout the exercise, and let me know if you see a single movement in the direction of elevation. This may seem a very trivial precaution, but it is these small matters which train our observation.

I remember being called to a case in which infantile paralysis was feared because the child did not extend the right leg. On having the patient undressed, it was at once apparent that, whereas the left leg was moved about freely, the right remained perfectly still. The child was not old enough to understand the order to move it, or, at least, did not comply. We were, therefore, reduced to the waiting method, a method which was rewarded at the end of perhaps fifteen minutes, when the child once involuntarily extended the leg perfectly. It showed signs of pain on making the movement, and did not repeat it. This single action was, however, enough to convince us that the limb was not paralyzed, but was held in one position to avoid pain. The diagnosis was, therefore, changed from paralysis to rheumatism, and a good prognosis given, a prognosis borne out by the speedy recovery.

Testing the biceps in a similar manner, we find in this case absolute lack of power to flex the forearm. The muscles of the forearm and hand appear to be unaffected. The child grasps the finger and makes other movements of the hand naturally, excepting as handicapped by the inward rotation.

The paralysis is then practically limited to the biceps, deltoid, infraspinatus, and perhaps the teres minor. This grouping of muscles I will ask you to bear in mind, as it is by no means an infrequent one. The combination was first pointed out by Erb, who called attention to the fact that electrical stimulation of a point over the brachial plexus above the clavicle would produce contraction of just these muscles, and since that time this has been known as "Erb's point."

This is the group of muscles most constantly involved in obstetri-

cal paralysis, though the process may extend to the muscles of the forearm and hand. While the pathology of the affection has not been absolutely established, the probabilities are altogether in favor of the brachial plexus as the seat of the lesion. The objection of Burr that sensation is unaffected need not deter us from this view when we remember how difficult it is to examine sensation in infancy, and when we remember also that anæsthesia is a far less persistent symptom in general than loss of motion. I need only remind you at this point that the numbness appearing after pressure paralysis of the musculo-spiral nerve is generally fleeting, though the wrist-drop persists for some time, and that in cerebral disease a temporary loss of sensation not infrequently appears and passes off with great rapidity.

Arguments have been adduced in favor of the spinal theory, which would assign lesion of the cells of the anterior horn as the cause of the paralysis. The prognosis alone should suffice to dispose of this theory, for cases of obstetrical paralysis almost invariably recover, though it may be after the lapse of a number of years; perfect recovery from disease of the anterior horn cells, on the other hand, if it ever occurs, is extremely rare.

Assuming, then, that the brachial plexus is the seat of the lesion, it will not be out of the way to devote a little attention to the probable mechanism. The subject has not received the attention it deserves, either from the scientific stand-point or from the point of view of the practitioner with regard to possible prophylaxis. It must be some comfort to the general practitioner to know that the view has been abandoned that operative interference is essential to the production of this form of paralysis, and I feel justified, both by experience and by study, in putting the case even stronger, for I have become convinced that in the vast majority of cases operative interference has nothing to do with this lesion. In the first place, it would be extremely improbable that pressure upon the neck should so effectually reach the yielding brachial plexus without producing extensive marks of external violence, and, in point of fact, in one reported case, in which such pressure was the undoubted cause of the paralysis, a most extensive ecchymosis with laceration of the soft parts was present. In further support of this view is the fact that the identical paralysis has many times occurred without operation or other external interference. A study of the mechanical conditions of childbirth furnishes us with an ample explanation for the lesion.

Let us consider the progress of the infant in the most common position,—namely, occiput left anterior. The shoulder is engaged at the brim of the pelvis anteriorly; the head is meantime rotated with the face away from the right shoulder; this rotation puts the brachial plexus on the right side upon the stretch. As the progress further develops, the head is not only rotated but also drawn forcibly away from the shoulder, thus bringing the brachial plexus, particularly its outer cord, against the inner edge of the unyielding clavicle. In tedious labors the parts may be kept in this position for many hours, a position which could hardly fail not only to press upon but actually to bruise the brachial plexus at this point. Oppenheim ascribes the entire trouble to pressure upon the clavicle, and if, as

Fig. 2.

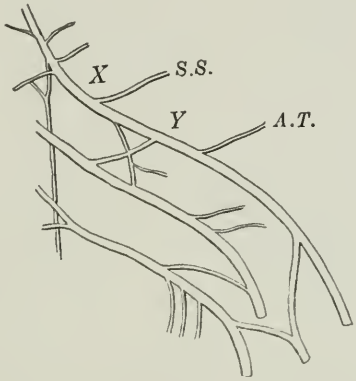


Diagram of brachial plexus, arranged after Gray. *Y* shows the situation of the clavicle; *X*, Carter's point; *S.S.*, suprascapular nerve; *A.T.*, external anterior thoracic nerve.

this writer assumes, the infraspinatus is rarely involved, this explanation would be ample. In my experience, however, the rotators of the humerus almost invariably *are* involved, the inward rotation of the thumb being one of the most noticeable features. Now, the suprascapular nerve, which supplies the infraspinatus, leaves the brachial plexus at a point above the clavicle, and the theory of my former colleague, Dr. Carter, that the brachial plexus is stretched at the junction of the fifth and sixth roots (see *X* in Fig. 2), would certainly cover this nerve as well as the branches of the deltoid and biceps. Neither of these theories, however, accounts for the exemption of the pectoralis major, which is furnished by a branch from both the outer and inner cords. It is true that the branch from the

inner cord might suffice for the preservation of this muscle; still it would seem that paralysis of the outer cord alone should, to a certain extent at least, impair its power. I have elsewhere[1] presented the view that Oppenheim's theory should be accepted to explain the paralysis of the deltoid and biceps, but that bruising of the suprascapular nerve, either at the suprascapular notch or at the edge of the scapular spine, should be added to account for the paralysis of the infraspinatus.

A paralysis practically identical with that just discussed occurs not infrequently in adult life. More than one patient has come under my observation in whom paralysis of this group, and even more extensive paralysis, has followed a fall. The patient in this case has usually fallen upon the head and shoulders in such a way as partly to separate one from the other, thus forcing the brachial plexus against the clavicle, in a manner similar to that just described. This is always the lesion first to be suspected when a patient appears with arm hanging helpless and with a bruise or an abrasion on the temple of the same side.

The so-called "Trendelenburg" position, in which a patient is placed for operation, is also prone to produce a similar state of affairs, though the mechanism differs in that the plexus is pressed against the clavicle by the extension of the arm over the head. This trouble is not to be confused with simple pressure paralysis caused by the arm of the etherized patient hanging over the edge of the table. In the latter event the musculo-spiral nerve is usually the one affected, and wrist-drop is the obvious result. It will serve you in good stead to remember both these possibilities, as well as that of paralysis from application of the rubber tourniquet, and to guard against them as far as possible. It is true that such complications are usually temporary and of comparatively little importance in cases otherwise serious. Still, they are often embarrassing and vexatious, especially when the original operation is one of little moment.

The relaxed position of the arm after all these brachial plexus paralyses, whether temporary or permanent, offers a striking contrast to the forced flexion and rigidity established, after a time, in case of paralysis of cerebral origin.

The relaxed condition is well shown in the case of this adult

[1] Boston Medical and Surgical Journal, December 24, 1896.

(Fig. 3), who was struck by an engine nearly a year ago; the brunt of the injury was received by the shoulder, and included paralysis of the brachial plexus. Movement is limited to slight flexion and extension of the fingers. As you see, all the muscles are wasted, the humerus hangs away from the glenoid cavity, and the elbow is extended, gravity alone determining the position of the arm. The wrist and fingers are, on the other hand, quite stiff, which reminds me to make an exception of these smaller joints to my statement regarding relaxation in peripheral paralyses. These parts are apt to

FIG. 3.

Brachial plexus paralysis of right arm, showing wasting of muscles and relaxed condition of shoulder-joint.

become stiff after all sorts of injuries, even with no paralysis. Prolonged wearing of a splint after fracture is alone capable of producing permanent stiffness and inability to close the hand.

The shoulder is especially liable to become relaxed after peripheral paralysis, as in this case, the unopposed weight of the arm dragging upon and stretching the ligaments, thus causing very considerable separation of the head of the humerus from the glenoid cavity. This state of affairs is hardly liable to occur in obstetrical paralysis, the arm being light, and recovery generally taking place before serious stretching of the ligaments can ensue.

The treatment of these cases consists in electricity and massage. Wearing the arm in a sling or other measures relieving the drag on the shoulder are desirable. The elevation of the arm may also, by raising the clavicle, tend to put the nerve in the best possible position for recovery, though this factor is problematical.

With regard to the treatment of the obstetrical variety of brachial plexus paralysis, the galvanic current is advocated, and we have been in the habit of employing it largely in the neurological department. It is, however, rather difficult and uncomfortable to give electricity to patients of this age, and the advantage to be gained is so doubtful that in private practice it is a question whether massage and keeping the arm as far as possible in a favorable position will not fulfil every requirement. The question of expense must, of course, always be taken into consideration. Whatever is or is not done for these cases, the result is generally perfect recovery, though sometimes after the lapse of a number of years.

With regard to prophylaxis there is little to be stated definitely. As a result of such study as I have indicated, the opinion is perhaps warranted that more harm is done by delay than by hastened delivery. The fear of obstetrical paralysis, as far as it plays a part in the mind of the accoucheur, should lead him to use, rather than to avoid, instrumental aids in tardy labors, to lessen the period of pressure.

PARALYSIS IN CHILDHOOD.

CLINICAL LECTURE DELIVERED IN THE WESTERN RESERVE MEDICAL SCHOOL.

BY HENRY S. UPSON, M.D.,

Professor of Neurology in the Western Reserve Medical School, Cleveland, Ohio.

Gentlemen,—I wish to call your attention to-day to a little group of cases of a good deal of importance. The symptom known as paralysis is thought of, even by some practicians of medicine, as one usually found in old people. This is so far from being the fact that some of the most important instances of it occur in children. It is especially necessary to find out the cause of loss of power in children and adopt proper measures to remedy it, because any impairment of motion, and especially anything which affects the trophic centres, leads in these growing little ones to much greater deformity than it does when it occurs in grown men and women. There is a marked tendency on the part of many doctors to call all paralyses in children anterior poliomyelitis, just as many physicians call all motor difficulties in the lower limbs of adults locomotor ataxia and all tremors of whatever kind chorea. In children the stroke, the paralysis of rapid onset, and the slowly creeping palsy are all seen not infrequently, and I wish to-day to show you some of these different types of disease.

Case I.—This little boy is two years and four months old. Ever since his birth he has suffered from loss of power in both arms. Labor was very difficult, the feet presenting first. The head was not injured, so far as is known, but the child seemed lifeless and had to be resuscitated by artificial means, and it was at once noticed that the arms were entirely motionless. Otherwise the child has always been fairly well. After the lapse of two months, during which no power was regained in either hands or arms, electricity was given, and within a few weeks the child began to move his fingers. Since then he has gained a moderate degree of power in the right

hand and arm and in the left hand. At the time the electricity was given there was apparently entire loss of sensation in both arms.

You see that the little patient is well nourished, but of not very good color, as if rather ill fed. He walks readily, but as yet talks very little. The head is large and well developed, with no evidence of injury. On inspection there is marked atrophy of the left deltoid muscle. The muscles of the forearms and hands are of good size. The muscles of the right arm and especially the right deltoid are much larger than those of the left side, but yet seem somewhat shrunken. The muscles of the forearms and hands react well to the faradic current, except the left supinator longus. No reaction can be obtained in the left deltoid, biceps, and triceps muscles. The same muscles of the right side react, but with a somewhat diminished irritability. An adequate test of sensibility is, of course, not possible in so young a patient. Pinching is, however, felt as pain, as well over the arms as on other parts of the body. The pupils are equal and react to light. The fundus oculi is normal on both sides. There is no deviation of the face; no wrist-jerk or elbow-jerk can be obtained on either side. The knee-jerks are equal and normal and there is no ankle-clonus.

The boy as you see him is, then, a bright enough looking little fellow, and the most marked thing which one notices on looking at him is his failure to move the arms at the shoulders, and the wasting of the muscles of the shoulders and upper arms. The question which presents itself in diagnosis is whether this difficulty is a muscular atrophy pure and simple, or an atrophy and loss of power dependent on joint trouble, either rheumatic or otherwise, or whether it is to be referred to disease in the nervous system.

The fact that passive motion can be carried on easily and painlessly is conclusive against the theory of rheumatism or other joint trouble. The fact that the disease came on suddenly, or at any rate so early in life, and that it has grown better rather than worse, and also that the arms were quite anæsthetic at first, excludes muscular atrophy, pure and simple.

The question next to decide is whether the neurons of the upper segment of the motor tract or those of the lower segment are the ones affected. As you know, the neuron of the upper segment is the ganglion-cell of the cortex with its axis-cylinder process to the cord. The cerebral cell furnishes trophic influences only as far as

Fig. 1.—Case 1.—Birth-palsy due to bilateral injury of the brachial plexuses.

the cord, but not to the nerve-trunk or to the muscles. It is clear, then, that when it is destroyed muscular wasting and loss of reflex are not apt to take place. You see in this boy that they have taken place very markedly. Undoubtedly a good deal of recovery has been brought about by time and treatment, and if we had seen this child early we should have found the wasting much more marked. We conclude, then, with a good deal of certainty, that the difficulty is at least as low as the large motor ganglion-cells in the anterior horns of gray matter of the spinal cord, and that either these are affected or the fibres running from them which constitute the peripheral nerves.

We might have made this diagnosis much earlier. Look at this boy and you will see at once that his paralysis is not one typical of brain-disease. Paralysis due to a lesion in the brain affects by preference the muscles furthest away from the centre, so that the muscles of the hand are quite powerless, those of the forearm are nearly so, and those of the arm and about the shoulder are less affected. You see in this boy that recovery has taken place in the hand and forearm, whereas the muscles of the arms and shoulders are still quite powerless and much wasted.

In deciding between the cord and the nerve as the seat of the lesion, we must be governed somewhat by the history. We may exclude poliomyelitis anterior by the history of marked anæsthesia at the onset of the trouble, and a diffuse cord lesion by the absence of paralysis and other symptoms in the legs, so that the indications point strongly to an affection of the peripheral nerves. The fact that the trouble is bilateral and that it came on at birth makes it practically certain that an injury occurred at that time to the nerve trunks making up the brachial plexus. This is not the ordinary form of birth-palsy. Paralysis is more frequently due to injury to the cortex of the brain by pressure of forceps or of the pelvic bones on the soft cranium.

The outlook in this case is very bad so far as recovery is concerned. After this lapse of time probably the limit of improvement has been almost reached. When the patient is seen earlier massage and electricity should be used, and in these cases with wasting the intramuscular injection of strychnine may sometimes do good.

Case II.—The next patient whom I show you is a little girl, two years and a half old, who has gone through a somewhat different

experience from that of the last child. I first saw her three months ago, four days after a sudden attack of paralysis.

She had always been fairly well, but not robust. Four weeks before she had a slight sore throat, which lasted for two days. She had a bronchitis following it, with fever off and on for a week. She made a good recovery from this and was up and about. Ten days later she suddenly developed quite a high fever, which gradually got better. She was convalescing very well. Then one day she seemed weak and it was noticed that she could not raise herself very well in bed. It was thought that she had a loss of power on the right side. On that day there was a marked coldness of the right hand and an uncertainty of movement, but no apparent loss of power. On the day following (Tuesday), the left side was quite powerless. This paralysis may have come on Monday or Monday night, but the exact time is not known. At no time has there seemed to be headache. Loss of power included the left arm, leg, and face; the eyes could be closed as before, and the patient spoke quite as well as formerly; there was no fever at that time, and she slept well; her appetite was good, her bowels regular. There has been no strabismus. On examination the patient was well nourished, but quite anæmic. The mucous membranes and finger-nails were very pale. She was bright, smiling, and talked as well as ever. There was absolute loss of power in the left upper and lower extremities. The face was drawn markedly to the right when she smiled, but she seemed to move the muscles of the left side of the mouth somewhat. She could not be persuaded to protrude the tongue. A prick on the left side was felt as pain. There was absolutely no pulse in the right wrist, but normal pulsation in the right brachial artery. The pulse on the left side was soft, regular, 128.

The examination was completed the next day, November 28, as follows: The general condition remains the same. The muscles of the left side respond well and promptly to the faradic current; the fundus oculi is normal on both sides. The knee-jerks are lively, somewhat more marked on the left side; there is well-marked ankle-clonus on the left side, none on the right; the elbow-jerk is slightly more marked on the left side.

The question raised in this case is whether the trouble is cerebral or spinal, and particularly whether it is cerebral apoplexy or a somewhat rare case of poliomyelitis anterior, involving, as sometimes hap-

pens, the face. It is, unfortunately, not possible to be sure whether the onset was sudden or only rapid, as the exact time of the appearance of the paralysis is not known. As there was no time for atrophy to develop in the muscles, the diagnosis practically hinged on the electric examination. In paralysis from a lesion in the brain affecting the upper segment of the motor tract, the muscles still react promptly to the faradic current. With the destruction of the ganglion-cells of the cord, as in poliomyelitis, the lesion is in the lower segment of the motor tract, and there is reaction of degeneration, shown by entire absence of reaction to the faradic current and a slowness of reaction to the galvanic current. As these muscles reacted well and promptly to the faradic current, it is quite impossible that they were paralyzed as the result of poliomyelitis. The paralysis must, therefore, have been cerebral. There is no cardiac lesion or other known source of embolism, and no reason to suppose a hemorrhage. The depression following grippe is a condition well adapted to favor the formation of a thrombus, and the occlusion of the right radial artery at or about the same time with the onset of paralysis of the left side points strongly to thrombosis of the right middle cerebral artery as the brain affection. The further progress of the case bears out this diagnosis, which was made at the time.

On December 2, nine days after the attack, the patient's color was better; there was still no pulse in the left wrist. There was good reaction to the faradic current in the muscles on the right side. During a crying fit while the current was applied, the arm was raised for the first time perceptibly. On December 3 a little voluntary motion was distinct in the toes. The hand and fingers were not moved. On December 16 the pulse in the right wrist was for the first time very plain, 128 to the minute, as was that in the left wrist. The patient ran about fairly well, but with a perceptible limp. She used the left side, not so well as the right, but moved it constantly and freely; the ankle-clonus had entirely disappeared on the left side. The patient then made a steady improvement. The limp is still perceptible, as you see, and there is a stiffness in the leg with a drawing of the Achilles tendon and a weakness of the ankle, which are overcome by a stiff shoe. The left hand is still used not quite so freely as is the right.

During the month following the first examination of the patient

the muscles of the left side were stimulated by the faradic current, for a time daily, then twice a week. The collateral circulation meanwhile established itself, so that the affected area of brain-tissue is now well supplied with blood, and it is possible that recovery will be practically complete. It should, however, be borne in mind that these cases of thrombosis are those which are most often affected by overaction and mobile spasm of the affected muscles later in life.

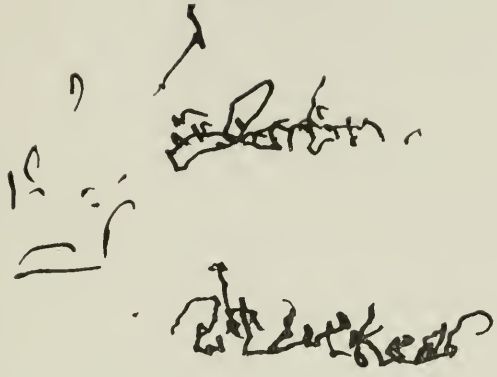
Case III.—The following case is, so far as I am able to learn, a unique example of congenital motor deficiency.

J. W., fifteen years of age. The patient, as you see, is a well-nourished, rosy-looking boy, not tall for his age but sturdy. He has been troubled with a weakness or, rather, an inefficiency of the right hand as long as he can remember. He has never been able to use it as well as the left, and when he attempts to perform the finer acts with it a tremor is set up which lasts for a few seconds and then passes away. This tremor comes rarely when he is not using the hand, but always when he is excited or agitated. He does not use the right leg quite as well as the left. When he walks the knee is not bent quite as much as is normal and the foot is swung out a little too much. He has no shaking in the foot. He has had no numbness, pains, or tingling. The patient is very bright and leads his classes in some studies; he has little, if any, headache. There are no nervous diseases in the family; the patient's parents, sisters, and one brother are all healthy; no history of injury, either at the time of his birth or afterwards, can be obtained. He had chicken-pox and measles when quite young, scarlet fever when seven years old, but had this trouble earlier. The mother first noticed it when he was two years old.

On examination the pupils are equal and react to light and with accommodation; there is no deviation of the tongue or face. On ophthalmoscopic examination there are choroiditic rings around the optic disks, more marked on the right side, with a little pigment and a moderate pallor of the disks at the edges; the eye-grounds are otherwise normal. There is no paralysis of any of the muscles; the grip is equal in both hands, about thirty-six on each side. The dynamometer shows sometimes a little more and sometimes a little less power. The knee-jerks are moderate; there is no ankle-clonus; the elbow-jerks are equal. No tremor is set up when he grips the dynamometer.

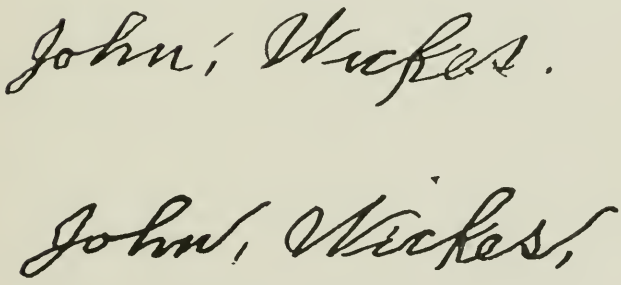
He says he has no trouble in currying a horse or doing other rough work, but when he tries to write very marked tremor of slow rhythm comes on in the whole arm from the shoulder. This is well shown in the accompanying attempt to write his name. He has learned to

FIG. 2.



Efforts at signature with right hand.

FIG. 3.



Signature with left hand.

write moderately well with his left hand. The pen is not gripped as hard as in writer's cramp, nor does it fall by a relaxing of the muscles, but is simply shaken by the tremor involving the whole arm, which is constant but does not show the coarser vibration seen in intention-tremor. Sensibility is unimpaired all over the body. He breathes through the mouth, possibly as the result of posterior adenoids; he has a slight lateral curvature of the spine.

This case is very hard to classify; there is no indication of any organic disease of the brain, and I believe that no such lesion, in the

ordinary sense of the word, exists. The tremor is brought on exactly as is an ordinary stutter, and by the same causes,—namely, the use of muscles in the finest co-ordinated movements. Stuttering is, without doubt, due to a lack of evolution of the co-ordinating centres of speech, as a result either of lack of development or of the formation of wrong association-channels, and this case may be fairly said to be a stuttering of the right hand.

Surgery.

FOUR CASES OF INJURY TO THE HEAD.

CLINICAL LECTURE DELIVERED AT THE PENNSYLVANIA HOSPITAL.

BY JOHN ASHHURST, JR., M.D., LL.D.,

Barton Professor of Surgery and Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania Hospital; Senior Surgeon to the University, and to the Children's Hospitals, Philadelphia.

GENTLEMEN,—We have recently had in the hospital several interesting cases of injury of the head, two of which I will show you to-day, as well as specimens from the two other cases.

CASE I.—The first case is that of a child whose injury you would suppose would be more serious than that of any of the others, and, as a matter of fact, the patient owes his life to the fact that he is a child. An adult receiving the same injury would almost certainly have perished. The child is a boy four years of age, and the history is that his head was run over by a wagon. He was brought to the hospital in a patrol-wagon, when it was found that the scalp on the left side was torn loose from the level of the parietal eminence down to the attachment of the ear, anteriorly almost to the angle of the eye, and posteriorly to the occipital bone. The bones were denuded in several places, the periosteum being torn off, and the temporo-parietal suture was loosened. Separation of the suture is analogous to a separation of the epiphyses of the long bones. As you know, the suture between the temporal and parietal bones in a child is not firmly united, as it is in an adult, so that it was quite possible to have a separation. The bones could be pressed down, when blood oozed out, showing extensive hemorrhage below, probably between the bones and the membranes, which is the most common situation for traumatic hemorrhage inside the skull. The whole wound was naturally in a very dirty condition. The child was excited and in the

second stage of shock, but the temperature was normal. Even to-day you can see the extent of the scalp wound, extending from behind the ear forward to the orbit, making an extensive flap. The bones were exposed and are so yet, but the flap is vascular and has a pinkish tinge, showing that the capillary circulation is still in existence. The probabilities are that the boy will recover. Some slight exfoliation may occur, but probably no extensive necrosis. The granulations may creep over the bones so that the skull will be covered and there will be no separation in visible particles. I observe that there is one part of the bone which seems to have lost its color, but it is only in one small spot.

The treatment of the case consisted of etherization, cleansing the flap with soap and water, and afterwards with an antiseptic solution, and putting in a few stitches. The patient was admitted on March 14, and the next day was very restless, the temperature at night being elevated. He had a good deal of traumatic fever, although when admitted the temperature was normal. After going as high as 102° F. one day, it rose to 104° the next, which was the highest point reached at any time. This traumatic fever is always to be expected in a child. From the highest point the temperature fell to 100°, and since has not been above 101°. The other day it rose to 101°, but for the past ten days has been about 100°, so that the child is practically free from fever. Internally calomel and Dover's powder were given in doses proportionate to the age of the patient and the child has gradually improved. The notes say that on the 18th he was much quieter, the pulse stronger, and that the urine contained a trace of albumen and a few hyaline casts. On the 19th he was much better, the wound looked well, and the patient was placed on a soft diet. On the 26th he was still doing well and the temperature was normal.

This in brief is the record of a case of very severe injury of the skull in a child. It was really equivalent to a compound fracture, except that it was a separation of the suture between the bones instead of a fracture of the bones. There is the same relation between a separation of the bones of the skull and a fracture of them as there is between a separation of the epiphyses of the long bones and a fracture. The fact that blood oozed out from under the bones when they were pressed, showed that there was a hemorrhage inside the skull, probably between the skull and the dura mater, as this is the

position in which hemorrhage resulting from direct violence is most apt to occur. If the membranes were ruptured there would most likely follow symptoms of meningitis.

As to operative interference, in a case of this kind there was no indication for anything in the way of trephining, as there was no compression of the brain and free drainage was already established. Besides the blood was not oozing in such excessive quantity as to need checking; so that the indications were to put the child at rest, apply cold to the head, and diminish the irritation of the part, which the calomel and Dover's powder did very well. The opium contained in the Dover's powder gave the patient sleep and quietness, and diminished the cell changes which occur in inflammation, while the calomel was used principally for what is called its anticipatory antiplastic effect. This is a virtue which calomel has in all cases of serous inflammation. Antimony was used by the older writers very extensively for the same purpose, but it is not so much used to-day. There is little doubt that the patient will recover, with but slight exfoliation of the bone. The larger part of the present exposed surface will granulate and gradually heal, and we may consider the child out of danger unless some unforeseen complication should arise.

Case II.—The second patient is a man who is convalescing from a severe injury to the head, although we cannot say that he is as yet out of danger. On account of his getting out of bed, we have been obliged to fasten his hands down. He was brought to the hospital in the patrol-wagon late on the night of February 22, with the statement that he had been found lying on the ground unconscious, no further history being obtainable. When brought in he was profoundly unconscious and the pupils were unequal, although I do not attribute much importance to the latter condition in head injuries. Attempts have been made to decide as to the seat of the lesion by the appearance of the pupils, but you will find that the evidence on this point is very contradictory. The same condition that is looked upon by some as indicating injury of the gray matter is regarded by others as indicative of injury of the white matter. When you find the pupils different from normal, it usually proves that there is some injury of the brain itself, but there may be various abnormal conditions of the pupil due to other causes than cerebral injury. Where there is marked difference in the pupils, it generally points to an involvement of the optic tract. In this case the left pupil was smaller and

there was considerable conjunctival ecchymosis under the left eye, although not like the ordinary "black eye." The same trauma that causes a bruise of the eyelid and face may also cause injury of the brain. Thus, an injury causing laceration of the blood-vessels within the cranium may at the same time be the cause of an external lesion. I think that in those cases of ecchymosis of the eye, or intra-orbital ecchymosis, which make their appearance some hours after the receipt of the injury, where there is no evidence of an external bruise, or where the blood makes its appearance first below the conjunctiva and subsequently comes forward, the inference is that the hemorrhage is deep seated, usually within the cranium, but sometimes in the orbit itself. This will allow the blood to leak forward and ultimately show itself below the eyelid. In the case of an ordinary "black eye" the eyelids swell up and turn dark first, but in this case the blood showed itself first below the conjunctiva, some hours after the injury was received, which was one of the distinctive symptoms that were presented. The muscles of the patient's extremities were extremely rigid and there was a tendency to convulsive contraction. His clothes were removed with much difficulty, and a small lacerated wound of the scalp on the left side was found, but no fracture. There is still a small scar over the parietal eminence. When brought in the pulse was very weak and the temperature subnormal, and it was not known how long he had been lying unconscious before he was found.

He was placed upon strychnine and digitalis, in order to meet the manifest condition of shock, which, of course, is the first indication in injuries of the head as well as in other injuries. The next day he had regained consciousness, but was perfectly irrational, and has not been absolutely reasonable since. He is a great deal quieter than he has been, but is still abnormal. The circulation has been very feeble and the extremities blue and cold. He was given calomel in small doses for the reason already mentioned, and on the 25th he seemed to be slightly clearer in his mind, although he talked in a wandering way. Three days after admission he could articulate a few disjointed sentences which had no meaning. The right side of the face appeared to be paralyzed, but the extremities were freely movable. He seemed to have difficulty in articulating and in finding words to express what he wanted to say. On March 1 the condition was the same, on the 7th he was very restless, on the 12th he was still

so, but was able to pass urine naturally. On the 19th he was restless, and no change was observed on the 26th.

The diagnosis may be made plausibly from the symptoms presented. From the evidence of an external injury by a fall or blow as shown by the scar, taken in conjunction with the intra-orbital ecchymosis on the left side, which is the same side as that of the scar, and the slight facial paralysis on the opposite or right side, with a condition of partial aphasia, so that the patient cannot find the words needed to express what he wishes to say, we are brought very clearly to the conclusion that there is an injury of the brain involving the speech-centre, and, from the presence of this intra-orbital ecchymosis, that there has been a fracture at the base of the skull involving the anterior fossa. The most distinctive symptom of injury to the anterior fossa is hemorrhage into the orbit and nose. When the middle fossa is involved there is apt to occur hemorrhage from the ears followed by watery discharge, and when it is the posterior fossa, blood may show itself far back below the mucous membrane of the pharynx. The absence of any general paralysis shows that the brain lesion was not extensive, and the slight facial paralysis would seem to show clearly the extent of involvement. With the fracture at the base of the skull there was probably a laceration involving the speech-centre.

As to the prognosis, I think the patient will recover as regards life, but his mental condition is far from being clear. You have doubtless observed that he repeats many times the same word and will repeat after you any question asked him. Where meningitis develops it usually does so at the end of the sixth or seventh day, and when a patient with head injury passes the ninth day without this complication we usually consider him safe. His great danger is from progressive softening resulting from the injury that has occurred, and we are watching his nutrition very carefully to avoid this by giving him abundance of nourishing food. He is taking quinine as a tonic, and has improved much, as his mind is somewhat better than it was a few weeks ago. The chances are that the patient will ultimately return to his normal condition, but as to the cause of his present abnormality I am uncertain. Some very ingenious theories have been suggested, which are plausible though not proved. One is that the nerve-fibres of the brain have been ruptured or lacerated by the injury, and that when they grow together the fibres

do not become exactly approximated to the opposite portions; just as in a wound of the soft parts or bones there will often be a slight displacement, as shown in the case of the soft parts by a scar. If such a condition did occur in the brain, of course a certain amount of incoördination might result afterwards in the mental condition. I suppose the neurologists of the present day would say that the neurons which formerly came together do not now do so; but these are only theories, and we cannot say what the ultimate result will be. The symptoms may go on for months and result in a condition of feeble-mindedness, softening occurring, and ultimately death. In other cases there is progressive improvement and a gradual restoration to the normal state. All evidence of the injury is fast disappearing, and as far as life is concerned the man is out of danger.

Case III.—The third case, from which I show specimens, was in a man fifty-eight years of age, a teamster by occupation, who was admitted to the hospital on March 14, the same day that the child came in. The child illustrated the old saying that no injury of the brain is so serious that it need be despaired of, while the man proved that no injury can be so slight that it may be despised. The child was subjected to much greater violence, and any one would suppose that the injury would have been much greater. The teamster fell from his wagon, striking his head, while the child was actually run over by a wagon, and yet the results were very different. When brought in by the patrol-wagon, the patient was unconscious, but shortly after regained consciousness and sat up in bed, gave an account of the accident, and took off his coat and vest. He complained of pain in the head, which no doubt was bruised. Dr. Henry examined him, but did not find any injury about the skull, and, as no external evidence of bone injury was present, it seemed to be only a bruise of the scalp. The pupils were equal and normal, neither contracted nor dilated, nor unequal. As he complained of pain in the head and no evidence of injury could be found, the hair was removed with the scissors so that a more careful examination might be made. When this was done two large effusions or hæmatomas were found, one on the right side and one on the left. Some depression was felt on the left side, but in the presence of a large hæmatoma it is difficult to be sure that you really feel a depression in the skull. It is a matter of text-book surgery that in these injuries you feel depressions and edges of swellings containing fluid blood. When the scalp is very

much bruised, you will feel a small fluctuating part with a distinctly hard margin. It is sometimes erroneously thought that these are margins of bone and that the central portion is depressed bone, when it may in reality be a perfectly normal skull with an area of softening in the middle of a bruise of the scalp. While Dr. Henry was making the examination the patient suddenly became unconscious, without any warning, and began breathing stertorously. The pupils instantly became very much contracted and the pulse became weak, but there were no convulsive movements. The left arm was paralyzed, giving us a very confusing state of affairs. The injury was apparently principally on the right side, because, although tumors existed on both sides and the largest seemed to be on the left side, it was the left arm that was paralyzed. Of course you are all aware that in cranial injuries the lesion is always on the side opposite to the paralysis. Thus, in the case of the patient that I showed a few minutes ago there was paralysis of the right side of the face while the injury was on the left side of the head. This patient was immediately prepared for operation, on account of the sudden change in symptoms. I was communicated with shortly after, and when I reached the hospital I found him in a profoundly unconscious condition, though he roused up enough to say a few words to his immediate relatives.

The scalp over both sides was separated by a large effusion of blood, and at this time the depression could not be felt, as the fluid blood seemed to have spread widely. With a history, however, of sudden unconsciousness coming on some time after the injury, I had very little doubt that the condition was due to hemorrhage resulting from rupture of some large vessel, as this is the characteristic history where we have a rupture, for instance, of the middle meningeal artery. I remember a case which illustrated this very well, occurring some years ago at the University Hospital. After receiving a violent blow on the head the patient was admitted to the hospital with evidence of shock. Convulsions came on and I trephined, when I found a rupture of a branch of the middle meningeal artery. The hemorrhage was arrested and the patient recovered. Where you have a rupture of a large vessel uncomplicated by serious laceration or concussion of the brain, the unconsciousness or the evidence of cerebral lesion does not follow immediately, as it does in most cases of fracture or gunshot wound, but comes on slowly, so that

there is a distinct interval between the time of the original injury and the development of evidences of brain lesion, during which interval the patient is conscious.

I made an incision here on the left side, as that was the side where the depression had been felt. In the absence of any localizing symptoms, with the evidence of a large effusion of blood on both sides and with the statement that a depression had been felt on the left side, I thought it was better to make my first incision there, and upon doing so found a large amount of fluid blood as well as a depressed fracture of the left parietal bone. I removed a large number of loose fragments of bone with the rongeur forceps and elevated the depressed portion, while all the time blood was coming out below the bone from the direction of the median line. I then enlarged my external wound and carried the incision completely across the scalp, working across from the place where I had made the first opening. My first incision was made without ether, but I had to have the man etherized before I attempted to cross over to the right side. Several bleeding points were found in the dura mater and sutured; two of them were bleeding quite freely. Blood continued to come from the median line, so that it became evident there was an injury of the longitudinal sinus. When I came upon this sinus the blood came out in a stream, as it would come from the basilic vein, and I immediately seized the sinus with hæmostatic forceps and applied a catgut suture. When possible this is the best way to control hemorrhage from a large sinus of the brain. Oftentimes when you cannot apply sutures you can control the hemorrhage by pressure, but I do not believe that an opening in the longitudinal sinus can be satisfactorily controlled in that way. There was still some bleeding after I had stitched the sinus, and I therefore used pressure in addition, by packing with gauze. Hemorrhage was finally controlled by the combination of the suture and the gauze. The wound was then closed and a few stitches were applied, leaving the central portion open so that there should be no undue tension. I have known cases in which concealed bleeding has caused so much tension as to give rise to convulsions, so I only used a few sutures and applied antiseptic dressings. The urine was drawn and examined, and found to contain albumen and a few casts, but no sugar.

I certainly expected that this patient would die during the night, but the next morning I found he was much better and entirely con-

scious. He could move all his limbs and there was no paralysis. He was also able to talk perfectly rationally, and upon loosening the bandage I found there was no hemorrhage. The next day he was still rational, but the temperature was subnormal. You will often find in convalescence from head injuries that the temperature becomes subnormal and the pulse falls as low as 45. His condition continued remarkably good until the 18th, or four days after the injury, when he became delirious and did not sleep. At this time we learned something concerning his history which had not been ascertained before. When he was admitted it was evident that he had been drinking, and we afterwards found that he was known as a very heavy drinker. At the time of his admission he was considered unusually sober. The characteristics of his delirium pointed more to alcoholic poisoning than to meningitis. We did not expect him to have meningitis, although he became delirious within a week of the injury. The fact that this delirium appeared on the night of the third day pointed much more to delirium tremens, as that is about the period when this will show itself. We often have patients who are drunk when brought to the hospital suffering from an injury, and after the liquor has been cut off for a few days they will break out in violent delirium. We have at present a patient in the hospital in whom this happened. The injury was about the patella, and the patient did well for three days, but on the third night he became delirious and thought the nurses were trying to kill him. This was an attack of alcoholic delirium, from which the patient soon recovered. The patient with the injured head did not sleep during the night this delirium developed. The next day the head was dressed, but he became more and more stupid until finally he was profoundly unconscious, and died at 1 A.M.

This being a coroner's case, we were not allowed to make a post-mortem examination, and therefore we cannot say positively whether this patient died of some cerebral lesion developing as a result of hemorrhage, or from hemorrhage into the brain substance, or from effusion into the ventricle, but I think the last seems most likely in view of his alcoholic habits. Patients with delirium tremens usually die gradually by the filling of the lateral ventricle, although at other times there may be an effusion into the arachnoid. I show you here a piece of the skull that I removed, which is but one of many similar fragments, as a large gap was made, extending from the left parietal

bone to the right across the median line, where the longitudinal sinus was exposed. The case was one of compound comminuted fracture of the skull, with rupture of the longitudinal sinus, from a comparatively slight injury, the patient at first doing much better than could be expected, but ultimately dying from delirium tremens.

As to treatment, where you have reason to believe that there is hemorrhage from a large vessel, the indication is clear to trephine. Even if there be no external wound nor any positive fracture, the history of the traumatism with the sudden unconsciousness developing shortly afterwards is a sufficient cause for trephining. I am not one of those who believe in trephining in cases of ordinary apoplexy, nor do I favor it in hemorrhage into the brain itself where we cannot hope to reach it without traversing the brain substance. If we did reach it the injury we should produce would probably do more harm than any good which could result. Where you have a case of traumatic apoplexy with a hemorrhage and a positive history of injury, it is right to make an exploratory incision, as if you do not find the source of the hemorrhage you will have done no harm, whereas if you do find it you can give the patient the proper surgical treatment and a chance for recovery. We were able to find the source of the hemorrhage in this case and to control it, and the patient for three days pursued a course which led us to believe that recovery might follow, but death ultimately occurred from a different cause,—*i.e.*, alcoholism.

Case IV.—In the fourth case the question of diagnosis was very obscure. The patient was a man thirty years of age, a tailor by occupation, who was brought to the hospital by his wife on the 21st of this month,—*i.e.*, nine days ago. He was able to walk to the car and from the car to the hospital. The history obtained was that for four years he had been suffering constantly from severe headache but had not been prevented from working. Eight days before admission he began to drink very heavily and continued drinking until the following morning. On the evening of this day he had sobered up somewhat and was walking home alone, when he became unconscious, and was found in the street in this condition. Whether he fell and became unconscious or first became unconscious and then fell is a question, but I rather believe the latter. He remained unconscious for three days, and the diagnosis could not be made as to whether the fall was the cause or the effect of the unconsciousness. There

was no evidence of injury about the head. For two days he had several general convulsions, although there was no paralysis. Two days afterwards, regaining consciousness, he could be about the house, and it was noticed that he had some difficulty in his speech. Towards evening he became delirious. Of course, when the man first came to the hospital the history was not obtained in any such clear manner as this. As a matter of fact, when he was admitted the symptom which attracted most attention was the marked retraction of the head, and the natural suggestion was that he had sustained an injury to the cervical spine, probably a dislocation. An X-ray picture was taken, when it was seen that there was no dislocation of the spinal column. In justice to myself, I should say that I did not believe that such was the case from the first, although some who saw the patient thought it probable. I mention this because the X-ray pictures are so much relied upon in courts of justice that it is very important for you to realize their possible errors. They are very valuable in confirming a diagnosis, but it is not safe to rely upon them exclusively. It is only a question of time until some surgeon will be brought into a court unjustly, and hence we should not place too great confidence in the picture. This patient's pupils were equal and reacted normally to light. He was somewhat pale and stupid, though not markedly so. The temperature was 100° F., showing a certain amount of febrile disturbance. There was no loss of power in any of the limbs, so that we had good reason to believe that there was no injury to the neck. From the history I thought the facts pointed to some lesion at the base of the brain or in the membranes of the upper portion of the spinal cord; the patient was, therefore, sent to the medical ward, where a different history was given. He became dull and stupid and would answer but a few questions, and on the next morning, the 24th, the left arm and leg and left side were markedly paralyzed, the tongue protruding towards the left side. The left eyelid could not be entirely closed, and it was evident that we had to deal with a complete hemiplegia of the left side. The explanation of the tongue moving towards the paralyzed side is that it is protruded by muscles pushing it, so that when the left side is paralyzed the same side of the tongue is usually affected. The condition, of course, at once disposed of the question of there being any serious lesion of the cervical cord, as you do not commonly have hemiplegia from injuries of that part. Even if you did it would not

be accompanied by paralysis of the tongue, face, and eyelid. There was also loss of sensation on the paralyzed side. In trying to get a further history of his case it was found that the man had had a chancre two years ago, with some enlargement of the inguinal glands, but there was no distinct history of a well-marked course of syphilis nor did we find any enlargement of the epitrochlear glands. He may have had syphilis, but we cannot be sure of it, as the genital lesion may not necessarily have been syphilitic and the enlargement of the inguinal glands may have been from some other cause than syphilis. A fact which was elicited some time afterwards was of great importance,—*i.e.*, that he was usually able to pass his water unaided, but sometimes had to be catheterized. Two days later, on the 28th, and also on the 29th, he became very dull and seemed to be less certain of what he wanted to say. However, there was no aphasia, and one would not expect that there should be, in a left-sided paralysis. On the 30th he seemed still more dull, and towards evening became feeble, dying at 3.15 the next morning.

This is the history of the case, and I think we have every reason to believe that the patient had a chronic cerebral lesion. You will remember that he had had severe headache for four years, and this fact and his drinking habits all point to cerebral irritation. Then, too, we must remember that he became paralyzed on the left side, which points to a chronic condition, which subsequently became acute, involving the right side of the brain. Retraction of the head points to the implication of the base of the brain also by this irritation. A fall occurred, and death finally resulted either by what is called wet-brain or by external pressure in some manner being brought to bear upon the medulla.

An autopsy was performed in this case, and the brain and spinal cord were examined, and his symptoms were then very well explained. When the cord was taken out, several large clots were found behind the upper part, but we could not observe any inflammation of the meninges. The brain was removed with the membranes entire, when a large clot, which was continuous with that in the spinal cord, was found pressing on the vital structures. This clot apparently accumulated and pressed upon the medulla until death followed by pressure on that part of the brain. On the upper surface of the brain was found enormous congestion of the right hemisphere, with ecchymoses and with clots, which had settled prin-

cipally to the lower part of the brain. There was great distention of the veins in the pia mater and also very marked arachnitis,—*i.e.*, inflammation of the arachnoid. There was also some inflammation on the other side, but much less than on the right. I am entirely satisfied, by an examination of these specimens and by the history, that the condition was such as I have pointed out. The patient had probably had meningitis for four years, during which time the headache had lasted, and it is quite possible that this may have been syphilitic, although it is not certain. I believe the patient had some source of cerebral irritation probably aggravated by his getting drunk and by this outbreak of alcoholism, the meningitis being so increased as not only to aggravate the headaches but also to cause him to fall unconscious, the unconsciousness being followed by convulsions. At the same time the intense congestion was partly the result of the fall. Although there was no evidence of any external injury, there was slight ecchymosis on the temporal side of the dura mater, showing that a rupture had occurred with hemorrhage into that structure. This hemorrhage gradually increased until it became sufficiently extensive to give rise to paralysis. Then it continued gradually until it became so great that it caused death. I am going to make a section of these hemispheres, because if the condition were due to traumatism the probability is that we should find marked punctiform hemorrhages in the brain itself, which is usually the case when death has resulted from hemorrhage in this manner. I do not see any such signs in the present case. One is often deceived by finding little spots very much resembling these hemorrhages, which are really small clots in the ends of the cut vessels, from which they may be picked out with the point of a knife, whereas if you were to pick out the clots of interstitial hemorrhage you would see depressions where they had been located. This case is, therefore, one of chronic meningitis with weakened vessels in the pia mater, followed by hemorrhage, in connection with an alcoholic condition and convulsive movements. That the man had chronic brain-disease is shown by the persistent headache aggravated by acute alcoholism, followed by unconsciousness and convulsions, and by his becoming paralyzed on the opposite side, showing the wide-spread involvement of the brain on the right side, finally ending in death. I am not disposed to think that this condition was due to thrombosis, but it is very difficult, and often impossible, to make a positive diagnosis. If the paralysis comes on

slowly in a young person with syphilitic brain-disease, it is usually caused by thrombosis, partly due to the arrested circulation and partly to secondary changes that follow.

As to treatment, there is very little to be done in a case like this, as the patient will probably die under any circumstances. He should be given calomel and Dover's powder followed by potassium iodide, but no treatment is likely to be of much service. The chief point of interest was the question of diagnosis between spinal and cerebral injury, which of course was cleared up when the hemiplegia showed itself, proving that the condition was intracranial and not intraspinal; the retraction of the head due to meningitis at the base of the brain, with subsequent hemorrhage pressing upon the medulla, and the gradual accumulation of blood, were also interesting points.

These four cases taken together, while not illustrating all the varieties of injury to the head, at the same time give you a good idea of the various cerebral and intracranial lesions which come under the observation of the surgeon. The first, that of a child run over by a wagon and yet going on to convalescence, was remarkable. The second, that of a man without any history excepting that he fell unconscious in the street, the symptoms pointing to a fracture of the base of the skull involving the anterior fossa, and leading to a condition of aphasia, also pointing to an injury of the left side involving the speech-centre, the impairment of the function of the brain and the outcome being still doubtful, with a fair prospect of improvement at least as far as life is concerned. Then comes the third case, with an extensive fracture of the skull and laceration of the longitudinal sinus, followed by hemorrhage and sudden unconsciousness coming on while being examined in the ward, the longitudinal sinus found ruptured when the operation was performed, the hemorrhage stopped by suture and pressure, but the patient dying in four days from alcoholism. Then we have the fourth case, in which a question arose between a lesion of the brain and one of the spinal cord, and, in the second place, between traumatism and other causal conditions, subsequent examination showing that the traumatic was the incorrect view. Taken together, they form a very interesting group of cases, and one the remembrance of which may, I hope, be of benefit to you in your future careers.

SURGERY IN RELATION TO TUBERCULAR DISEASES.

CLINICAL LECTURE DELIVERED AT THE VICTORIA INFIRMARY.

BY A. ERNEST MAYLARD, M.B., B.S. (Lond.),
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Gentlemen,—Somewhat contrary to our usual custom, I have decided to lecture to you this morning not upon any specific phase of tuberculosis, nor upon any particular region of the body which it is wont to attack, but upon the disease as a whole, wheresoever it may have its origin and development. It is well for us sometimes to take a wider sphere of contemplation, with regard to a subject like tuberculosis, than we are in the habit of doing. Usually, as you know, we deal with some particular class of cases: we consider either morbus coxæ, Pott's angular curvature, or some other equally well-recognized form of disease in which we accept a tubercular condition as the basis of the lesion. Now, in a city like Glasgow, where tuberculosis in some shape or form is so rampant, and in a hospital like our own, where I think it may be safely said we have rather more than an average share of these cases, for reasons I shall presently refer to, it behooves us not to let pass the exceptional opportunities afforded us of observing these cases collectively, and seeking out certain facts which are liable to escape us when we limit our attention to individual cases or classes of cases.

At present we have in the wards seventeen cases of tuberculosis, and, as our total number of patients is forty-two, I think that is a sufficient reason for my asking your attention this morning to some general reflections upon tuberculosis viewed from a surgical aspect. Dr. McCaffie has been kind enough to look up for me the total proportion of cases of tuberculosis admitted to my wards since the first of January of this year,—that is to say, within the last six months. I find, from these statistics, that out of a total admission of two

hundred and three cases we have had sixty-seven suffering from tuberculosis in some region of the body,—that is, about one in three, or a percentage of practically 33.3. I know that if we were to trace our records still farther back our total admissions for this particular disease would mount up to a very considerable number. So you see the reasons are very cogent why we should pause in our usual course of procedure and reflect a little upon the somewhat extensive experience we have had in dealing with this very numerous and very varied class of cases. It is only by a wide survey of this kind, embracing the disease particularly in its pathological and etiological aspects, that we are likely to get information that may prove helpful to us in the matter of treatment.

I have told you that my remarks are to be upon the subject of surgery in relation to tubercular disease; by this you are to understand any manifestation of the disease which is admitted into a surgical ward for presumably operative treatment. Tuberculosis is pathologically the same disease wherever it occurs; its distinctive characters are due solely to the region involved, and this concerns not only the histological characters of the lesion itself, but also the symptoms evolved.

I need hardly remind you, at this stage of your medical career, that every lesion connected with tuberculosis is caused primarily by the presence of the tubercle bacillus; it is to the destruction and eradication of this micro-organism that every endeavor, whether medical or surgical, is directed.

Now let us take, as our first general survey of the subject, the causes which predispose, and which excite the appearance of tubercular disease in those parts of the body in which in our surgical cases we are most prone to meet with it. If we run quickly through the cases which you may see in these wards, you will find them to be the following: tubercular affections, such as ulcers and abscesses, of the skin and subcutaneous and intermuscular connective tissues; of lymphatic glands,—cervical, axillary, femoral, and inguinal, occurring mostly in the same order of frequency; of joints,—hip, knee, ankle, tarsal and metatarsal, shoulder, clavicular, elbow, wrist, carpal and metacarpal, spinal and sacral; and of these experience, I think, teaches that affections of the hip are most common, while those of the clavicle and shoulder are least so; of bones, among which hardly any appear to be exempt, where there is cancellous tissue there is

more likely to be disease than where there is compact. If we attempt to consider relative frequency of involvement in this class of bone cases, we must include our out-patient department in our survey, those cases which we treat as daily attendants and not as residents within the wards. We then find, I think, that the bones most frequently involved are the metacarpals and the phalanges, possibly next come the tarsals, metatarsals, and tibiæ; among those which we see least are affections of the bones of the vault of the skull. As regards other bones of the skull there is the petrous portion of the temporal, which is not infrequently affected, and there is one bone of the face which appears peculiarly prone to infection,—the left malar. To return to our list of tissues and organs affected with tuberculosis, we have a very large class of cases of involvement of the internal organs. Thus, there is one class which embraces the genito-urinary organs,—the testicle, the vesiculæ seminales, the prostate, the bladder, the kidneys, and their various connecting tracts; another which takes in the alimentary canal,—the tongue, tonsils, pharynx (œsophagus and stomach very rarely), and intestinal canal. While the intestinal tract is the region most frequently involved, it is interesting to note that parts about the ileo-cæcal valve, the cæcum and lower part of the ileum, are those oftenest infected. In connection with the alimentary canal we may include tuberculous affections of the mesenteric glands and the peritoneum. Lastly, we have the nervous and respiratory systems. In the former there is the brain and spinal cord, with their ensheathing membranes; in the latter, the larynx, trachea, and lungs. You see, therefore, from this exceptionally long list, that there are very few parts of the body exempt from some local manifestation of tuberculosis; or, as I might somewhat more to the purpose put it, there are very few regions which we as practical surgeons are precluded from having to deal with by some operative measure.

Now, in trying to get at some truths which a collective investigation of the subject might be likely to afford us, the first question which naturally presents itself is, Is there a tangible cause which, either as predisposing or exciting, can be said to account for the frequency of this all-pervasive disease? I do not know that we are warranted in introducing the somewhat debatable question of predisposition. Whether a patient is or is not predisposed is rarely a consideration we entertain, or one which would be of any real service to us if it were possible to do so, when a case is admitted under

our charge. As you might judge from a general survey of the patients at present in the wards, there is very little to warrant you in saying that predisposition is an unfailing feature to be observed in the face or general condition of all the cases. Thus, look at that little child in bed six, an artist might reasonably take it as a model to illustrate perfect health, and yet it has extensive disease of the tarsus; on the other hand, look at the boy in bed fourteen in the male ward, whose tubercular affection is neither so severe nor so extensive as in the case just referred to, and yet he is pale, emaciated, and distinctly ill looking. If predisposition to tubercular disease does exist, it must be looked for by other signs than those visible to the naked eye. The utmost we can say is, that, when we ascertain that an exciting cause of, so far as we can judge, exactly the same nature and extent gives rise in one case to disease and in another to no ill effects, there probably exists a predisposition in the former; and this probability becomes increased if we learn that other members of the family are or have been affected with lesions of a similar nature though not necessarily in the same region. So far, therefore, as practical surgery is concerned, we may leave out of consideration the difficult question of predisposition, and direct our attention to the possible existence of some special or general kind of exciting cause.

What first strikes one, in a general review of our cases, is that we are frequently able to elicit a history of some antecedent devitalizing influence,—that is to say, the tissues or parts involved in the tubercular process have been at some time previous subjected to agencies which have weakened, if they have not temporarily destroyed, the normal functions of the part. The agencies may work either from without or from within. In the former case we usually have traumatism of some kind. It is rare that you will not find a history of some blow, twist, strain, or wrench, often of a very slight character, which has preceded the appearance of disease in a joint or bone. It is often not so easy to determine a cause which, working from within, has been able to damage or devitalize an apparently healthy part. In the case of lymphatic glands there is very strong evidence, as a rule, to show that the glands have been subject to infection and abnormal irritation from some septic surface lesion, either on the skin or the mucous lining of the internal tracts. In the case of the intestine it is interesting to note that the region of the canal most

frequently attacked is, as I have already observed, the ileo-cæcal. It is here that ulceration is likely to follow mechanical injury from the passage through the normally constricted orifice of undigested materials of various kinds. Without going any farther for illustrations of devitalizing influence in other regions or tissues, I think we have sufficient evidence to indicate the strong probability that in nearly all, if indeed not all, cases of localized tubercular lesions there has been some damage to the tissues involved prior to their assuming the typical state. As the result of our surgical experience, I question very much whether we are permitted to entertain the idea of any spontaneity of origin,—that, in other words, a part can become tuberculous except it has been previously prepared by losing in some way its normal healthy resisting powers.

The next question which concerns us is, Why should a part which has been, it may be, but slightly injured become in one case a tubercular lesion, while in another case it returns to its healthy state? The subject of predisposition, of course, comes in here again, but, even supposing such a condition does exist, we have yet to explain the infection of the part with the tubercle bacillus. In connection with any lesion of the skin or mucous membrane the possibility of surface inoculation must be allowed; but no such explanation will suffice as to disease of such parts as the joints and bones; here we must suppose either that the microbes were in the connective tissue of the part before the exciting cause occurred, which liberated them and admitted of their development, or that they were circulating in the blood and found their way from the possibly injured or inflamed capillary vessels into the devitalized or damaged tissues. The latter is probably the correct theory; but the discussions as to how the bacillus gets into the vessels, and whether its presence there is a peculiarity of possibly predisposed individuals,—whether, indeed, it is an essential factor of predisposition,—I have no intention of entering into. I wish you, however, to bear in mind the two conclusions which, I think, our remarks above permit us to arrive at, for they are of considerable significance in the matter of treatment: first, that probably in all cases there is some exciting, devitalizing influence which prepares the part for the tubercular process; and, second, that the bacillus, entering this devitalized part either by means of the lymphatics or the blood-vessels, finds a nidus suitable for its development. As a corollary to these two conclusions, it follows that,

were it not for want of some normal healthy resisting power on the part of the tissues, the tubercular process could not take place.

Now let us discuss what bearings these considerations have upon the question of treatment. Take as a first subject for reflection our last conclusion, and the corollary that the tubercular process is essentially the result of some want of proper resisting power on the part of the tissues, but for which the bacillus could neither live in the blood nor develop in the body.

You know that it is a rule, in regard to cases admitted into my wards, that no operation is performed upon cases of tuberculosis until they have been in the house for some days or weeks, unless, of course, there is some special or urgent reason for immediate interference. We prefer to wait and try the effect upon the system generally of hospital regimen. What that consists in you ought to have a fair idea of. Briefly it is this. The air which circulates in the wards is washed, warmed if need be, and driven in at such a rate that the whole is completely changed every twelve minutes. It is practically "open-air treatment," of which so much has recently been said regarding pulmonary cases of tuberculosis; and I am inclined to regard it as of considerable importance also in other forms of the same disease. The better aëration of the blood must have a primary good effect upon the blood itself, and this must work a secondary favorable influence upon the tissues. In order further to improve the general bodily condition, I am in the habit of giving tuberculous children one-drachm doses, three times a day, of a mixture containing equal parts of syrupus ferri iodidi and ferri phosphas co., and to both children and adults cod-liver oil, either alone or in conjunction with malt extract. As free a diet as the hospital is capable of providing is also ordered. If there are open sores, these are carefully and frequently dressed, every effort being made to get them into as healthy a condition as possible. The result of this treatment very frequently is that we begin to see, often in the course of only a few days, a marked improvement in the physical state of the patient.

In adopting these preliminary measures, we are working on a basis not merely empirical but founded on lines such as we have recently been discussing as the probable cause of the commencement and progress of the disease, and experience abundantly teaches us that it is the correct course to pursue. But, as a rule, a certain stage

is reached in our hospital cases when we feel that delay is no longer advisable; that, while the general condition may have much improved and the local lesion also, yet the latter is not likely to be cured without operative interference, and further delay would only end in advance and extension rather than decrease of the disease. But consider how infinitely more favorable are the conditions under which we operate if we have been able to increase the normal resisting powers of the tissues. Remember that I told you that devitalization of tissue, whether by traumatism or by septic absorption, was probably in most, if not in all, cases the necessary preparation of a nidus for the development of the bacillus. When we operate we are compelled to damage more or less the tissues surrounding the diseased part; if those conditions still exist which gave rise to the original lesion, we are again preparing a soil for the further and future development of the same process. I am convinced that many cases of recurrence owe their explanation to what I have just stated. You know that the teaching regarding operations upon localized lesions of tuberculosis is like that regarding carcinoma,—the diseased part must be wholly and entirely removed. What I refer to is cases where we have every just reason to believe that the disease at the operation has been so removed, and yet in the course of some months, it may be, when the part has healed and we have fancied that our cure had been complete, a recurrence takes place in apparently the same or almost the same region as the original seat of disease. I say that I believe these to be cases of recurrence arising not from foci of disease left at the time of operation, but from fresh developments of the organisms in tissues necessarily damaged at the operation and not sufficiently healthy to undergo repair and exercise the requisite resistance. You will understand now why we are anxious by every means in our power to get rid of the bacilli in the blood, if perchance they are circulating there, and to improve the general health of the patient. By so doing we hope to increase the local resistance of the tissues and thereby accelerate and augment the process of healthy repair.

I have already indicated to you that the principle upon which we act in operating upon any case of tuberculosis is the complete removal or destruction of the affected area. I have something more to say to you upon this particular point, and it will serve to bring out the peculiar value of a lecture of this kind, where we are survey-

ing and summarizing, and not focussing our attention upon any individual case. Experience has taught us here that in certain groups of cases we are more successful in special regions. Thus, take the group of joint cases, one of the commonest with which we have to deal. We here find that the greatest number of most perfect results have been in cases of disease of the ankle-joint. We are able to obtain such a free and open inspection of the joint that it becomes possible in most instances to know that we have entirely removed the disease. Our custom is to cut freely into the joint by an anterior incision, dividing tendons, vessels, and nerves, subsequently suturing the former in order to obtain good flexion of the foot. Of course, we occasionally get equally good results in other joints, such as the hip, knee, elbow, etc.; but, taking them altogether, I think there is little doubt that our ankle cases most frequently turn out best. The reason for this greater success I attribute to the fact that we can be more certain of getting at all parts of the diseased joint, and, since we always erase and but rarely excise, this freedom of access is of paramount importance. I do not believe it is possible purely to erase the hip-joint, by which I mean the removal by cutting and scraping of all the diseased tissue; excision is the only satisfactory method of operating, for without removal of the head and most frequently the trochanter also, it is quite impossible to get freedom of access to the acetabulum and parts on the inner side of the joint.

No matter what joint or indeed what tissue or organ is involved, you may take it as a serious drawback to complete removal of the diseased part if abscesses have formed in and around the original focus. These abscess-cavities are so irregular in shape, extending sometimes so far and in so many directions, that it is very easy for a pouch or prolongation of the sac to escape notice. It is sometimes by the merest chance that one comes upon a small pocket of curdy or caseous material, which connects with the original seat of the disease by a simple, narrow, straight or tortuous channel. I have often, in operating upon cases of this kind, completed, as I thought, the entire removal of the disease, when an accidental squeeze or prod somewhere has caused the evacuation of a concealed purulent cavity which has thus by the merest chance been revealed. How often we must leave unrecognized foci like these to infect the seat of our operation, and be the cause of a return, sooner or later, of the old trouble!

Of course, we always look for our best results where we can excise the organ or region affected, cutting, it may be, into tissue well away from the seat of the disease. Thus, excision of a kidney or testicle, when the disease does not extend into the ducts leading from the organs, may result in a permanent cure. Again, resection of a localized affected region of the intestine will give an equally good result. Tubercular lymphatic glands, where the source of infection has been removed or cured, will only need excising to rid the patient permanently of any further trouble in that particular region. Amputation of any portion of a limb for disease situated distally is a very effectual method of eradication; but, while this is always easy to do, we rarely like to resort to it before we have attempted and failed to cure the disease by more conservative measures.

Let us now consider in conclusion results likely to accrue from incomplete removal. We may, I think, divide our cases into two classes,—those where the result of incomplete removal shows itself more markedly in the locality of the disease itself, and those where it is subsequently met with in some other region of the body. With regard to the former class, I have no doubt that by far the larger number of recurrences within a month or so after operation arise from the extension of the disease from some unremoved focus or foci. Before we operate upon any part, nature is struggling, by means of barriers set up around the seat of disease, not only to check its extension, but also completely to defeat the effects of its presence. Should she successfully accomplish the latter end, a natural cure is effected, although it may be at the expense of some loss of normal function. When we operate we do so to help nature still to effect the same end, which, however, without our assistance she would be unable to do. Taking, then, this view of our service, it is quite easy to see how we may hinder and indeed completely upset nature's recuperative efforts, by damaging her protective barriers, thereby affording increased facilities for the extension of any foci left behind. There is no better cultivating medium for the tubercular bacilli than devitalized blood-clot and serum left in a wound after operation. It behooves us, therefore, in all cases where we are in any doubt as to complete removal of the disease, to insure the escape of these media. By no measures is this better effected than by stuffing the part with some absorbent antiseptic tissue. The exuded

blood and serum permeate the tissue and, becoming mixed with the antiseptic,—iodoform, it may be,—no longer furnish a suitable nidus for the growth of the bacillus. The stuffing can be withdrawn and fresh material inserted, and so anything like a collection of devitalized tissue will not be allowed to remain.

In the second class of cases of incomplete removal, when the disease subsequently arises in some other region of the body, the explanation is to be found in the absorption of the bacillus with its products from the original focus and its metastatic deposit elsewhere. We are compelled by our operation to lay bare and open various absorbent lymphatic and vascular channels, so that it becomes a simple matter for infecting material to be taken up and distributed elsewhere. The wonder is that this general dissemination does not more frequently take place. In reality it comparatively rarely occurs, and when we do meet with a case it is usually seen in the form of tubercular meningitis. So far as my experience goes, the meningeal form of the disease most frequently follows upon operations upon the joints. It may be that the extremely rich supply of blood and lymph-vessels to these actively employed parts renders absorption readier and easier.

There is just one other interesting fact I should like to touch upon before concluding, and that is the effect upon the patient of operating upon a localized lesion when this exists in conjunction with phthisis or some other similar organic tubercular disease. It is not rare for these cases to come to us; at present we have three such in the wards. In one there are tubercular glands in the neck, for the removal of which the patient has come into the hospital, but she has extensive tubercular disease of one lung. In the second a tubercular knee is combined with extensive disease of both lungs; and in the third there is also a tubercular knee, with, I believe, tubercular enteritis. You may take it as a general rule in this class of cases that, unless you can remove, with a fair degree of certainty, the more distal lesion, you should not operate; and, further, there need be no objection to operation of this kind unless by reason of a too-advanced state of the patient's general condition. There does not appear to be any hinderance to the local healing powers of nature from the state of the lungs or bowels. I have known striking instances where amputation stumps have healed completely and rapidly while the patient has steadily succumbed from the disease in other

organs. On the other hand, perform an incomplete operation upon a patient otherwise seriously organically affected with tuberculosis, and you will augment the condition. I never saw this result more evident than in a case of extensive hip and acetabular disease combined with tuberculosis of the bladder, in which operative interference with the hip led to an exacerbation of the bladder symptoms and rapid death.

ON THE FREQUENCY OF CASES OF UNSUSPECTED SYPHILIS.

CLINICAL LECTURE DELIVERED AT ST. LOUIS HOSPITAL.

BY ALFRED FOURNIER, M.D.,

Professor of Syphilology in the Paris Faculty of Medicine.

Gentlemen,—I wish to speak to you to-day of the patients who come to you in good faith, absolutely unaware that they have or have had syphilis. We see such cases frequently in our wards, and had one only recently, as you no doubt remember. Their importance in ordinary practice is considerable.

A man will come to you, for instance, with a gumma that is manifestly syphilitic, yet when you question him he denies ever having had any such disease. In spite of his assertions you are confident in your diagnosis and prescribe the usual treatment, and the patient recovers rapidly. You were, therefore, right.

This is the type of this class of patients. It may seem to you incomprehensible that such a thing can be as a patient reaching the tertiary period without knowing that he has the disease, and yet it is only too true. All physicians of experience will tell you that they have treated as syphilitic many a lesion in patients who denied ever having had the disease, and that there are a large number of people who are syphilitic without knowing it.

Some objections to this view have been made. Thus, it has been said that these cases may be errors in diagnosis, or that the patients deceive their physicians purposely, or that they are instances of tardy hereditary syphilis.

As regards the first objection, that they are mistakes in diagnosis, this may be true in some instances; so much I am willing to admit. But how can you suppose that a mistake in diagnosis was made in the case of the woman who recently passed through our wards, and whose gumma yielded so quickly to the ordinary treatment? Yet she was in absolute ignorance as to her condition.

Again, in reply to the second objection, that the patients deliberately mislead their physicians, this is also unquestionably true; every physician has occasion to fathom the degree of deceit of which some patients are capable in cases of syphilis. A man came to see me recently with lesions that seemed clearly syphilitic, but his energetic denials bore such an appearance of truth that I allowed myself to be persuaded and prescribed a non-syphilitic treatment. At the end of a week he was worse, and I pressed him to own up that he had deceived me; but, as he continued in his denials, I again gave him a non-syphilitic treatment. Two weeks later his condition was so serious that I told him he had had syphilis whether he was cognizant of it or not, whereupon he confessed, giving as his excuse that he had been afraid I should betray him! No one will, therefore, deny that syphilitic patients deliberately deceive their physicians, but those who are most expert in the art are our women patients, who have raised the habit of denying the possibility of their ever having had syphilis to the level of a fine art.

Let me give you another instance of how a foolish man may stand in his own light. A worthy provincial lawyer contracted syphilis during a spree in Paris. He concealed the fact, took no treatment, and one fine day was stricken with hemiplegia whereby he was made a cripple for life. When he came to see me I asked him why he had concealed his disease from his family physician where he lived. His reply was, "I could not tell him because he was my wife's physician!" This man, therefore, preferred to become a cripple rather than run the risk of his wife discovering his disease.

But in spite of the frequency of such cases there are many where there is no question of dissimulation. See the poor people we have in our wards; many of them are quite incapable of appreciating the serious character of their complaint, and have no reason for, and nothing to gain by, concealment. With them the disease is unquestionably unsuspected.

As regards the third criticism, that these are tardy cases of hereditary syphilis, there are undoubtedly grown persons who manifest syphilitic lesions inherited from their parents. When a man has had syphilis it is evident that he will not tell his child; consequently, if syphilis develops when the child grows up, he may be in absolute ignorance of its origin or nature. The question becomes more complicated still when we remember that syphilis in its heredi-

tary form may appear in the second generation! Such cases have been published and are well authenticated. Thus, in 1854 a syphilitic woman was treated in the general hospital of Christiania; in 1860 she had a daughter who was treated at the same hospital for very serious hereditary manifestations; twenty-eight years later this child married a man who was perfectly healthy, but she gave birth to a syphilitic child. Such cases do, therefore, exist, and unsuspected cases of syphilis may be hereditary manifestations; but they must be rare in comparison with the cases where the disease has been contracted unwittingly.

Unsuspected syphilis is relatively common, as I shall prove to you: every physician has seen such cases. In the space of five months one of my house physicians found twenty-eight instances of it; but, then, we see nothing but syphilis in our wards. Among my private patients I find that in several thousand cases more than four per cent. were absolutely unaware that they were syphilitic.

These instances are, as was to be anticipated, far more common among the lower classes than among educated people, who by their culture, education, and reading are generally aware that such a disease exists and are not apt to let it go unperceived. It is also much more frequent to find unsuspected syphilis among women than among men. Most boys have heard of the disease even at school, and know that it lies in wait for them in their future dissipations. I fancy that few girls ever hear of it, and that most married women do not even know it by name. Syphilis is, therefore, for women an enemy which they do not know. Thus, among my private patients, if we take the total number of unsuspected cases, I find about six women to one man.

If you will only reflect on the subject a little, you will see that there are many and quite sufficient reasons why cases of unsuspected syphilis should be frequent. To begin with, in syphilis contagion often takes place outside the genital sphere. In the eyes of ordinary people syphilis is purely a venereal disease, the result of debauch. Now, syphilis, as a matter of fact, is the least venereal of this class of complaints. Whereas the simple chancre and gonorrhœa are practically always venereal, extragenital syphilitic chancres occur in the proportion of from eight to ten per cent.,—in the mouth, on the face, hands, abdomen, and thighs. How many physicians contract extragenital chancres in the practice of their profession, or midwives in

obstetrical work! Unsuspected syphilis is not rare among medical men themselves, who make the most extraordinary errors. I could, for instance, tell you of one of our leading surgeons of to-day, who, having contracted a chancre of the finger, treated it as a tubercle; and of a professor of our own faculty, who, although a victim of a chancre of the tonsil, did not realize that he had syphilis until the tertiary period. He, by the way, directed me in his will to impress his case upon you! You will probably be amazed when I tell you that in my single experience I know of six physicians who did not grasp the fact that they were syphilitic until the truth was forced upon them by the appearance of unquestionable tertiary lesions. If this can be the case in a medical atmosphere, what ought we not to be prepared to find among people in general!

Not only has syphilitic contagion often nothing whatever to do with debauch or the genital region,—that is to say, has no connection with venereal disorders,—but its manifestations or lesions are frequently so unobtrusive as not to attract any notice.

Take the Hunterian chancre, for instance; it may be small, rudimentary, superficial, or hidden away beneath the foreskin. It may be of short duration, and be gone really before the patient has had time to think it may be something more serious than an ordinary sore owing to the length of time it has lasted. If, again, you consider the chancre in women, owing to the anatomical arrangement of their genital organs, it is, one might almost say, the rule for it to pass unperceived. In syphilis the glandular reaction is generally indolent and moderate; in the majority of cases the patient has no knowledge of its existence until by your questions or examination you direct attention to the little lumps rolling beneath the skin. The cutaneous manifestations of syphilis also give rise to neither itching nor pain. They require to be seen to be noticed, and I need hardly tell you that there are many cases of roseola where the eruption is so pale and discrete that even when looked for it is not any too easy to detect. As regards the mucous patches of the mouth, what is easier than to take them for canker sores, or for a sore throat? The patients may think they have had similar manifestations many and many a time before. The hair comes out; but there are scores of reasons for that occurrence, and with women what complaint brings them more frequently to the doctor's office than the loss of their hair? Syphilitic headache may be taken for

migraine, the articular pains for rheumatism, and, finally, the iritis for any of the other forms of that disorder.

Consequently you will see that there are a thousand and one reasons why, with non-observant or careless persons, a syphilitic outbreak can very readily escape detection, and you may take my word for it, until you are in a position to verify the fact for yourselves, that it does so escape on a great many occasions.

The characteristic of unsuspected syphilis is that the patient comes to you and by his account of himself and symptoms tells you, as plainly as can be, that he is syphilitic, without saying so in so many words or using that term. To assist at such an interview is really an interesting experience, though in genuine cases the interview becomes dramatic when you have to break the truth to the totally unprepared patient. Some men, whose regular life has not brought them much into contact with libertine circles, look on syphilis as a terrible affair, and to hear that they themselves have the dreaded disease is almost equivalent to hearing a death-warrant.

Another reason why unsuspected syphilis is so frequent is that its method of procedure is not always regular, nor are its symptoms as characteristic in all cases as they are in the average case. I have already mentioned that the roseola may be very faint-colored or consist in only a few scattered elements. The mucous patches may also be quite insignificant, and the other symptoms equally unimportant or lacking altogether. Such cases can be readily overlooked by the physician, but they are capable at the tertiary period of making up in severity for the mildness of their beginning, and this is what sometimes happens.

In the case of women syphilis is frequently unsuspected for the very simple reason that everything is done to keep the fact from their knowledge. A man, for instance, who finds he has given syphilis to his wife will take very good care not to tell her if he can help it. He makes a preliminary visit to his physician before bringing his wife, tells him the circumstances, and tries to bind him to secrecy for the sake of peace. Then, when the two come on the following day, the woman is, or is supposed to be, taken in by the conspiracy. Some other name is given to her symptoms, but the regular treatment is prescribed. Just how far some women are deceived by this stratagem is an interesting question, and a great deal could, no doubt, be said concerning it; for my part, I am sure that many wives de-

liberately pretend to be taken in by their husband and physician although perfectly well aware that something is going on, even if they are not acquainted with the disease, rather than face the explosion that would naturally occur if everything came to light.

The danger of deceiving a patient in this way is that, if she is taken care of in later years for some serious tertiary disorder by another physician and denies all knowledge of the disease, she may mislead him, with the most serious results.

This is naturally the great danger in unsuspected syphilis,—that some serious tertiary lesion may occur that will not be recognized and treated until the damage done is irremediable, such as perforation of the palate, necrosis, cerebral or spinal lesions producing incurable paralysis. It is also a serious matter at an earlier stage that a patient with such a virulent lesion as mucous patches should be moving in a family circle without any knowledge of what a source of danger of contagion he or she may be to its other members.

One of my former masters was in the habit of saying at the patient's bedside in his wards, "When I don't quite understand the appearance of a case I suspect syphilis; I have cured many patients in that way that would otherwise have died."

Therefore, in making your diagnosis never lose sight of the possibility of syphilis, especially as the farther we go the wider becomes the domain of the disease. How many new provinces has it not invaded during the last twenty-five years,—the larynx, eye, lung, kidney, liver, arteries, heart, brain, and spine! Before that time no one recognized any connection between syphilis and some of the disorders of these organs.

Bear well in mind the frequency of these cases of unsuspected syphilis, and, when any lesion appears to you to be syphilitic, give the proper treatment, no matter what the patient says.

I have seen a number of cases of cerebral syphilis cured in spite of the denials of the patients, and not long ago a chief of clinic in this hospital intended to amputate the thigh of a patient who recovered perfectly under the use of iodide of potassium!

Let me sum up in closing: 1. Syphilis, for many reasons, may be unknown to the patient. 2. Such cases are commoner than any one would imagine. 3. There are many cases where a syphilitic treatment must be prescribed although the ordinary symptoms are absent and in spite of the patient's denials.

A RATIONAL VIEW OF THE APPENDICITIS QUESTION.

BY JOHN B. ROBERTS, M.D.,

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Appendicitis is a very common and a highly important affection of the abdomen. It is the cause of nearly all cases of peritonitis in men and of most cases of that disease in women except those due to diseases of the uterus and its appendages. It is an infectious disease, associated perhaps with imperfect drainage of the contents of the appendix into the cæcum. The ordinary colon bacillus is the usual pathogenic cause, but other organisms are at times apparently the infectious agents. Sometimes foreign bodies or fecal concretions in the canal of the appendix seem to predispose to the inflammation by causing damage to the mucous membrane and rendering it liable to bacterial invasion.

Ulceration of the mucous membrane, thickening of the walls, mortification, perforating ulcers, obliteration of the cavity, and distention with mucous or muco-purulent fluid are pathological findings. Adhesion of the inflamed appendix to surrounding structures often occurs as a result of the peritonitis produced by appendicitis. Retroperitoneal abscess burrowing in various directions, intraperitoneal abscess enclosed by a wall of lymph and intestines, and general peritonitis are results of the infection of the vestigial structure called the appendix. Death is a common result of appendicitis, and occurs through peritonitis or through chronic sepsis from burrowing suppuration. In acute cases death may take place from violent septic peritonitis in a few hours. In chronic cases death may not result for many weeks. Recurrence is not infrequent after recovery from an attack of appendicitis followed by months or years of freedom from trouble.

Pain, vomiting, and rigidity of the abdominal wall in the region of the appendix are early and important symptoms. Symptoms of local or general peritonitis followed at times by those of

suppuration and abscess are later events. At first the pain may be felt in the neighborhood of the navel or in the epigastrium. A little later, however, it is usually localized at a point between the anterior superior spine of the right ilium and the umbilicus. In rare instances the situation of the appendix is such that the pain and inflammatory symptoms occur on the left side of the abdomen. At first the pain may be paroxysmal and be thought to be caused by intestinal colic. The bowels are sometimes constipated, at other times unusually loose. The temperature may show a slight rise. The pulse is likely to become increased in frequency. Chill is not common either in the early or late stages of most cases. When perforation takes place, as it frequently does, the escape of the contents of the appendix causes peritonitis, and the febrile movement is more marked. If the peritonitis is localized, swelling and dulness on percussion may be noticeable. Then signs of an abscess within the abdomen become evident. When a general infection of the peritoneum has occurred, tympanitic distention, high temperature, and great abdominal pain quickly arise. If death does not occur, the symptoms of inflammation may gradually subside, and the patient be restored to full health or to a condition in which some tenderness is felt at the seat of the appendix and in which there are occasional attacks of pain associated with vomiting and purging. The chief symptom in chronic appendicitis is pain in the appendix region, with some local tenderness. These symptoms may subside, to recur at irregular intervals. The digestive disturbances not infrequently lead to a mistake in diagnosis and failure to recognize that the appendix is the seat of the pathological process.

Acute appendicitis must be diagnosticated from salpingitis, renal calculus, internal strangulation of bowel, ruptured ectopic pregnancy, cholecystitis, and ovarian neuralgia. In some cases the diagnosis is not difficult. It is based upon the localized pain, the tenderness and abdominal rigidity, and the infrequency of other abdominal inflammations. Chronic appendicitis is rather more difficult to recognize with certainty, and especially is this the case in women, with chronic pain in the region of the appendix, who have evidences of probable pelvic disease. Sometimes the swollen and painful appendix can be felt by palpation with the fingers through the wall of the abdomen, if the muscles are made flaccid while the patient lies supine with the hips flexed. This examination must be made with care, lest a dis-

tended appendix be ruptured and its contents emptied into the abdominal cavity. A long appendix hanging down into the pelvis may, if inflamed, simulate inflammation of the uterine appendages. In some cases of this sort nothing short of exploratory incision can clear up the diagnosis. Those who assert that the diagnosis of appendicitis is always an easy matter speak ill advisedly or without a thorough knowledge of the subject. Inflammation of an appendix turned upwards gives rise to symptoms similar to those due to inflammation of the gall-bladder.

In the treatment of appendicitis the practitioner should remember that it is a surgical disease, though a considerable number of cases may be successfully treated by medical means. A physician who undertakes to treat appendicitis should have a considerable knowledge of surgical diagnosis, or else he should be aided in the conduct of the case by a surgical colleague. The necessity of recognizing the precise moment when medical means should be replaced by operative treatment makes this combination of medical and surgical knowledge important. The first requisite in the successful management of the disease is its recognition. All doubtful cases should, therefore, be regarded as cases of appendicitis and given careful supervision. This view of the case will never do the patient harm and will keep the attendant alive to the seriousness of the condition.

In cases of mild onset the patient should be compelled to go to bed, the bowels should be opened by an enema and a mild laxative, and cold should be applied to the iliac region. Active purgation and very large rectal injections are sources of possible danger, as they might cause perforation of an ulcerated cæcum or appendix. Opiates should be avoided, because they lock up secretions and, by stopping pain, lull the patient and physician into a condition of false security. If the symptoms show little increase in severity during the first twelve hours, it is probable that the patient will get along on medical treatment and will not require operation. If, however, the pain becomes severe and there is local rigidity of the wall of the abdomen over the appendix, with continued vomiting and frequent pulse, exploratory incision and preparations for the removal of the appendix are indicated. The patient may have little or no fever, and yet operation may be demanded. If these mild cases show no tendency to become severe, but remain at a stand-still or begin to improve in the first forty-eight or seventy-two hours, no immediate operation is

called for. It is possible, however, that a local abscess will form which may demand evacuation, or that removal of a painful appendix will subsequently be required to relieve the patient of recurrent attacks of inflammation associated with adhesion of the chronically inflamed organ. When an attack of appendicitis begins with severe local or severe general symptoms, operative treatment is demanded and should be promptly given. In the same manner, severe symptoms suddenly arising in the course of the milder cases of the disease demand immediate operation. It is because of the uncertainty that the mild cases will continue mild that the professional attendant should be on the alert to give or obtain prompt surgical aid as soon as the infection of the peritoneum is of a character to demand it. The sudden emergencies sometimes arising in mild appendicitis and the great severity of some cases from the beginning have led some surgeons to advise operation in all cases of appendicitis as soon as diagnosis is made. Such advice is neither judicious nor rational. While it is true that death may sometimes occur because operative treatment has been omitted or not given soon enough, it is also true that death may occur from operation unnecessarily done in cases that would have recovered under medical treatment.

Intraperitoneal operations of an uncomplicated character are very free from danger when performed by aseptic hands with aseptic surroundings. Such favorable circumstances are not always obtainable, and promiscuous operating is sure to lead to some calamities. It is probably a good rule to operate not only in all cases where indication for operation is clear, but also in those where in accordance with the rules given above there is doubt as to the necessity of operation. Such a rule of action will exclude from operation a considerable number of cases in which it is clear that operation need not be done at all, and some in which operation can at least be delayed until time has been given to study the case and allow its symptoms to develop and indicate its nature.

A danger of operating for the removal of the appendix in cases of three or four days' standing is the possibility of breaking through the wall of lymph and intestines which separates the local suppuration from the remainder of the peritoneal cavity. A fatal infection of the whole peritoneum may be thus caused. A few days' delay may, however, allow a thick wall to form, and then operative evacuation of the abscess, with or without removal of the appendix, may

be done with greater safety. This statement does not indicate that delay is proper as a routine treatment. Promptness in operating is more frequently necessary than delay is justifiable.

The incision for removal of the appendix should be about three inches long, and made over the swelling or point of greatest tenderness. If there is no special indication of this sort, it should be placed over a point midway between the navel and the anterior superior spinous process. The cut may be parallel to the outer edge of the rectus muscle or extend obliquely downward and forward parallel to the direction of the fibres of the external oblique muscle. The deep dissection is best made by separating without cutting the muscular fibres of each layer of muscle in the direction which these fibres take. By this method the openings through the three muscular layers will not be all in the same direction, and when they have been closed by buried sutures the integrity of the belly wall will be much more like that of the normal abdomen, and hernia at the cicatrix will be unlikely to take place.

It is not my intention now to discuss the various methods by which the appendix is excised and the stump treated, for the object of this paper is rather to endeavor to formulate rules for guidance in determining when and when not to operate. If the appendix is embedded in adhesions it may be a difficult task to uncover it. A too prolonged or too vigorous search may rupture the fibrinous wall that protects the general peritoneal cavity and lead to a fatal peritonitis. When active symptoms have subsided, operation may be done in the interval between one attack and a possible future recurrence without this risk of contaminating the peritoneum with pus. It is better, therefore, in some cases of abscess to be satisfied with draining the abscess-cavity by means of a free incision and to leave the appendix unmolested. It can be dealt with at a later period if it gives further trouble.

Within a few years the knowledge of appendicitis has been greatly extended, and many former views of inflammation in the iliac fossa have been revised. The acerbity with which some writers have discussed the question has only served to show the difficulty of obtaining a calm and dispassionate discussion of even a scientific problem. The views here expressed have been reached after a study of a great deal of recent surgical literature and some experience in the treatment of the disease both medically and surgically.

CARCINOMA OF THE RECTUM; TUBERCULOSIS OF THE CERVICAL GLANDS; SPINA BIFIDA; MELANO-SARCOMA OF THE TESTICLE—CASTRATION.

CLINICAL LECTURE DELIVERED AT THE RUSH MEDICAL COLLEGE.

BY THE LATE JOHN B. HAMILTON, M.D., LL.D.,

Professor of the Principles of Surgery and Clinical Surgery in the Rush Medical College, Chicago, Illinois.

CARCINOMA OF THE RECTUM.

Gentlemen,—The first case that I present to you is one of carcinoma of the rectum. I have not previously seen the case, but I received a telegraphic message from my colleague, Professor Senn, asking me to complete this operation. The operation is that of inguinal colotomy or colostomy, performed at two sittings. It is the same operation as that which is performed by Madyl in the lumbar region. The preliminary steps of the operation were described to you last Thursday by my colleague, and it only remains for me, in the completion of the operation, to say I take it for granted that you have in your minds perfectly these preliminary steps,—the exposure of the intestine, the bringing of this intestine out of the incision, and the passage of the glass rod, over which iodoform gauze has been wrapped, so as to make the knuckle of the intestine project over this rod. We have it here, and we find the man is in fair condition. It now remains simply for me to open the intestine with the actual cautery, so as to allow the passage of fecal matter,—in other words, the formation of an artificial anus. We find the bowel stitched into the wound by its mesentery, and adhesion is supposed to have fully taken place, and from its appearance I have no doubt that now is the proper time to open it,—that is, the third or fourth day after the initial operation. I burn a good-sized opening into the bowel and remove the rod.

The effect of these operations is favorable so far as the immediate result is concerned. It does not relieve the carcinoma. [It affords me pleasure to inform you that the patient on whom we operated last Saturday for carcinoma of the rectum is doing fairly well. In that case a Kraske operation was performed. Her temperature is nearly normal, being a little above 100° F., and the pain is much less than it was before. There was some shock following the operation, but to-day her condition is fairly favorable, and it is probable that she will receive a good deal of benefit from the operation. You will remember that we did a Kraske, which involved total extirpation of the rectum, leaving simply the sphincter intact.]

You will notice the velvety folds here of the interior of the intestine. We will now remove the iodoformized film.

TUBERCULOSIS OF THE CERVICAL GLANDS.

We have here underneath the ear a tumor, which the patient states has been growing for a year and a half. It is painless. Its slow growth indicates that it is not malignant. It is apparently attached at its upper portion to the deep fascia, but is separable from the parotid gland. We will remove it. I have now removed the broken-down glandular structure almost entirely. It is probably tubercular, and this diagnosis would seem to be further corroborated by the inflammatory tissue about the gland. It is broken down in the centre, but the cut section seems by its hardness to resemble round-celled sarcoma; so in this case we depend for our diagnosis entirely upon the microscope. However, I think it will be found to be tubercle and not sarcoma. It now remains to arrest the hemorrhage from this wound. As the abscess has been evacuated, it only remains to remove the *débris* that is in it. It is a good deal easier to extirpate the gland when the case is seen sufficiently early than it is to attack it when it is breaking down. As I raise the glands they break down and discharge pus; they are very soft and tender. Had I known that we were going to have such extensive breaking down, I would have divided the sterno-cleido-mastoid, so as to get freer access to the operative field.

SPINA BIFIDA.

We have here from the dispensary a well-marked case of spina bifida. The cleft is very small and narrow. It is a favorable case for operation, but it is hardly fair to take a child off the street and

undertake to perform an operation for spina bifida. It is a very delicate operation. It involves the delicate membranes of the cord and frequently the spread-out filaments of the cauda equina. The injection treatment introduced by Brainerd many years ago has fallen into disuse of late years; in fact, I do not know of any one at the present time who advocates that method of treatment. But such a case as this, where the opening is small, is a favorable one for operation, as nerve filaments are not likely to be involved. The procedure which I would recommend in this case is, first, the patient must be placed in the hospital and carefully prepared. If I should operate on this case as it is at present, with all of this accumulated filth in the crevices or folds of the skin, infection would certainly occur, followed by meningitis and probably death of the patient. The severest test of one's aseptic technique is to be found in operations on the membranes of the brain and spinal cord; and so I would not undertake to operate on a case like this, coming in from the street, and then send it out again after the operation. I should expect to hear of a fatal result shortly thereafter. There is but one thing to do in such cases,—namely, direct the parents of the child, or whoever has charge of it, to have it admitted to the hospital, to stay until it gets well after the operation. It is not proper to treat such a patient as a dispensary case. No more serious operation can be performed than that upon the membranes of the spinal cord, but the farther we are removed from the cerebral centre the less the danger.

As to the loss of cerebro-spinal fluid which is contained in the sac, we can avoid that entirely by reversing the child during operation. This is the method that will be pursued. The child will be held up by the heels while the sac is emptied, so there will be no leakage of cerebro-spinal fluids during the operation.

As to the technique of the operation, other than strict aseptic procedures and methods, there is little to be said. We make a plain incision, dissect the sac, which is the dura mater, and cut it off. We then unite the wounded dura with catgut sutures and replace it in position, taking care all the time, by reversing the child, that cerebro-spinal fluid does not escape. In this way the operation can be performed with very little shock and with little difficulty, and I think there is every reason for us to advise the parents to have the child submitted to an operation of that sort.

MELANO-SARCOMA OF THE TESTICLE—CASTRATION.

This patient comes to us for the purpose of having castration performed. I have not examined the case. Three months ago the right testicle began to swell; there has been great pain, and the swelling has not disappeared. The dispensary physician states that there is no record of any venereal affection, and none can be obtained from the patient himself on cross-examination. The age of the patient (sixty) is one in which carcinoma is very apt to occur. So I infer that it will be well at least to examine this testicle by means of an incision and then we can easily determine whether or not it is best to remove it. First, we must ascertain positively whether it is a fluid or a solid tumor. This, in case of doubt, we determine usually by the exploratory syringe, by which test this would appear to be a solid tumor. We now make a direct incision. It is undoubtedly a sarcomatous testicle, a melano-sarcoma, as it is pigmented. I shall now proceed, therefore, to remove it. It is a rule, in the performance of castration for malignant disease, that we should go as far up with the cord as is practicable, almost to the internal ring, retracting the cord for that purpose as much as possible. I shall not tie the cord *en masse*, because I believe it is bad surgery, but I shall find the spermatic artery and tie it with the vein. I shall not tie the vas deferens. With the catgut it is best to make three knots, for fear of slipping, and to tie the cord in two separate places. I find that my ligatures are quite firm, and I have nothing to do now but to sew up the sac. I seal the wound with iodoform collodion, and, as our instruments have been clean and every precaution has been taken, we do not need any drainage.

HERNIA IN CHILDREN: A PLEA FOR RADICAL CURE AS ROUTINE PRACTICE.

CLINICAL LECTURE DELIVERED AT THE EAST LONDON HOSPITAL FOR CHILDREN.

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Gentlemen,—There are few departments of surgical work in which asepsis has brought about greater changes than in the views held as to the proper treatment of intestinal hernia. I propose to-day to confine my remarks to non-strangulated hernia and its treatment during childhood. Among congenital weaknesses, as distinguished from congenital deformities, there is no other which so handicaps a boy as a hernia. I refer especially to boys, for, though not peculiar to them, it is the male subject which suffers in greatest number, in size and severity, and in the resulting disability which a hernia entails.

I cannot give you any trustworthy figures as to the relative numerical incidence of this defect, for there is no obligation to register the fact, and as families move about from place to place, a ruptured subject may be seen at several hospitals and by many medical men; thus, in making up tables of hernia, there is always a danger of a case being counted more than once, sometimes even several times over. In countries where military conscription prevails, young men have to present themselves before the military authorities, and the subjects of hernia are thus discovered and registered. These figures, however, give but a very imperfect idea of the total number of herniated boys, since so many die before the military conscription becomes due. The number, however, is very large indeed, and is variously estimated as one in fifty to one in thirty in children under five years of age.

I shall not, however, base any remarks or my suggestions for radical treatment on mere numbers, but rather on the difficulties and

disabilities which beset ruptured boys, especially among the working classes, for, though the boys of the upper classes are not exempt from these troubles, they can, at least, be provided with the best trusses and with such constant medical supervision as they need.

A hernia is a direct danger in itself, and a source of weakness and discomfort throughout life. The boy with a hernia is a constant anxiety to his friends; while at school he is unfit to engage in the active games of his school-fellows; or, if he does, he is sure to come home with the rupture down, even in spite of a truss. As a young man, he is unable to pass the physical examination required nowadays by the naval, military, and civil services, by most of the insurance agencies, and by the large employers of labor. A hernia is thus not merely a serious handicap for the sons of a laboring man; it is equally so for the sons of a rich man who may wish them to enter the navy or the army. For those who would go farther afield and try a colonial life, a hernia is about as severe an impediment as it is possible to imagine. In this part of London, the loading and unloading of ships in the docks and of barges, etc., at the river-side, employment in the shipbuilding yards and at the railway depots is exceedingly laborious work, which requires men of iron physique; none but those who are free from defects can engage in it with either comfort or safety.

I do not pretend that all who suffer from hernia during infancy will necessarily suffer as adults. Nature, more or less aided, does certainly close up a certain number; very few, however, are completely cured if a cure has not been effected within the first fifteen or eighteen months of life. The sac once formed remains; its interior walls may become more or less agglutinated together by the pressure of a truss, or even without one, by the natural tendency of the parts concerned; but such a sac is very often reopened at a later date, in response to some sudden pressure which forces the intestine down into it. Hence the frequency among adults of the form of hernia termed "congenital."

The anatomical conformation of the parts undoubtedly predisposes to hernia, especially in males. The passage of the testis from the abdomen to the scrotum, during the last weeks of intra-uterine life, and the opening which must of course remain patent through life for the spermatic cord and vessels, account for the much greater frequency of hernia in the male subject. That hernia does not occur

with even greater frequency is an accident for which we may be devoutly thankful; the internal and the external rings would seem at first sight constructed in the best possible manner, and to be situated in the best possible position to favor the development of hernia, notwithstanding the fact that during intra-uterine life the fœtus is developed with the head down, in which position the abdominal viscera gravitate away from the pelvis. It is on this account, probably, that so few infants are born with an actually visible hernia. During a twenty-two years' experience, I remember to have seen only one single case. Though the anatomical conditions are existent at birth, hernia seldom occurs until after the first month or six weeks of independent life, and more commonly not for many weeks later. I should think the sixth month is about the most usual time. Much depends on the development of the child, and on the care which it receives—or does not receive—during the earliest weeks of life. It is thought by many that some peculiar condition of the mesentery exists which permits the descent of the intestine; by others that the dyspeptic troubles from which so many infants suffer, leading to flatulence and distention of the intestine, are the chief cause. Probably both factors are at work, and are concerned in the occurrence, but the chief factors, as I have just said, are the internal and external abdominal rings. When they are large and flabby, there is little or nothing to keep back the intestine, and any unusual strain on the abdominal muscles, or any unusual pressure upon or among the coils of the intestine, will tend to force them down; once having found their way down, it is most difficult to keep them back.

In this connection, there is a largely contributory factor in the production of hernia on which I will just say a few words. It is the almost universal practice to envelop young infants in flannel (or other material) binders in order, as the old nurses say, "to support the navel" and the belly generally. As you know, protrusion of the navel occurs very frequently, and a popular notion exists that a binder can prevent this if only it is put *on tight enough;* well! this is a wrong idea entirely; the flannel binder is an excellent thing in itself,—the mistake lies in pinning it on *too tightly.* An infant's intestines are subject to distention from flatulence, especially after taking food, and if a bandage is fitted too tightly a great strain is put on the weak points in the abdominal wall, especially on the hernial rings; over and over again I have seen babies crying and

struggling with their binders, the scrotum full of distended coils, their breathing seriously interfered with, and their mothers, or nurses, seemingly quite unaware how largely the tight binder was at fault, until the loosening of it at once re-established ease and brought relief. Observe, gentlemen, I am not condemning the abdominal binder. A flannel binder, broad enough to reach from the armpit to the top of the thighs, is the most essential and the most useful part of an infant's dress: its purpose is *to keep warm* the vital organs of the chest and belly; but it should in no way be used for the purpose of *constricting these organs.*

And this brings me to the practical side of the question. What is to be done for a child with hernia? Shall it be left to nature? shall some attempt be made to aid nature? or shall we take the matter boldly in hand and at once perform the "radical cure"?

I am very decidedly of opinion that the hernia must not be left to Nature; if Nature has not already closed up these openings in the abdominal wall at the time of birth, I fear she never will do so afterwards without considerable assistance from art. Though spontaneous cures are recorded, I think it would be eminently unwise to trust to this off-chance. A truss, then, is the next alternative,—and until within a few years was practically the only one; this is essentially an instrument whose function is to keep back the herniating intestine and to press together the walls of the sac in the hope that they may become adherent, and so bring about obliteration of the sac. The number and diversity of the trusses that have been invented and manufactured since trusses first came into vogue testify better than anything else to the unsatisfying results and the difficulties associated with the wearing of them. Let me put before you as shortly as possible what is required of a truss, and what a truss involves. Truss wearing even for adults, who can help themselves and are able to fix and refix their instruments whenever this may be necessary, is attended with many difficulties quite apart from the initial cost of procuring them,—a not inconsiderable item, however, among the poor; the springs are apt to break, and they lose their power from long use, and the coverings wear out, and absorb perspiration and other undesirable products, which render frequent renewal imperative. Among children truss wearing is beset with still greater difficulty: the child grows, and the truss, if it is to be of any service at all, must grow with

it,—that is, must be renewed every few months. It needs, also, constant watching to keep it in its place, for a child cannot refix it as an adult can, and it must also be kept clean and wholesome. The younger the infant, the greater the trouble of keeping a truss in a wholesome condition. Owing to the semi-liquid condition of the fæces, the large amount of urine passed, and the want of control of these functions, an infant's truss is more frequently than not soiled and saturated; the skin is tender and easily excoriates; the discomfort caused thereby often leads to crying and straining, and then the mischief is added to rather than relieved. To be of real service, *a truss must fit perfectly;* under the most favorable circumstances its use must be continued for at least five years; it has to be worn night and day for the first few months; later on, when the hernia is found to remain up, the truss is sometimes left off during the night: it has to be, or ought to be, replaced while the subject is still in the recumbent position; during the daytime, as the results of the natural movements of the body, the truss frequently becomes deranged and needs as often to be readjusted, for the return of the hernia for even one hour effectually neutralizes all steps in the process of repair that may have been obtained from complete control of the hernia during a whole month or longer. Except these conditions are carefully observed truss wearing is lost time. Moreover, a truss then becomes worse than useless; it is harmful; the rupture gets down, the truss notwithstanding, and the spring aids to keep it down, and so contributes not a little to intensify the condition. I think no one can doubt that it is mainly the pressure of the truss on the unreduced hernia which gives rise to the adhesion so frequently found between sac and contents, a condition which, of course, quite prevents cure by the truss, and further complicates the cure by any other means. It will have to be conceded, I think, that truss wearing is not the simple matter that some people think it; rather that it is a very serious matter; that the advantages which it promises are problematic at best, and that such cures as it effects are obtained at a heavy cost of time, trouble, and temper.

Now let me put the case of the radical cure. One of the most interesting features in connection with the operative treatment of boys is the complete change which has come about in the lay opinion on its value. When radical cure by operation was first mooted, the parents consented to an operation only after considerable persuasion.

Now they bring their boys and urge an operation on the surgeon. One of the cases which I have demonstrated to you to-day was brought to the hospital for operation, and on being told that the rupture was a small one and could probably be controlled by a truss, the father, a railway porter, still urged an operation, saying "the company would not take him into their service when older if he has a rupture."

And now I come to the essential point of my lecture, to urge on you the radical cure as *routine treatment.* We must first discuss the age at which this routine treatment should, as a rule, be advocated. Mere age must not, however, decide the point; if an infant only a few days old came in with a strangulated hernia, its age would be no contra-indication against relieving the strangulation by operation, nor would any surgeon to-day think mere relief of strangulation all that was called for, the age notwithstanding. In cases, however, where the circumstances are not urgent, is this a safe line of practice? *What would the surgeon himself wish done, if the patient were his own child?*

As already said, according to my own personal observation, a non-strangulated hernia is rarely if ever seen in very young infants; the surgeon is usually consulted after the third or fourth month, and more commonly later still. I should say that if Nature had not closed the hernial openings by the time a child is eighteen months old, whether a truss has been worn or not, an operation is justifiable; while for somewhat older children the operation becomes more and more called for, and in children of three years and upward *I plead that a radical operation should be de rigueur.*

The admitted tendency of hernia to heal spontaneously during infancy is an argument in favor of operation much more than against operation, for the chances of a complete cure by the operation are thus increased. No one can doubt that the stretched condition of the abdominal muscles with their ligamentous and fascial attachments and prolongations,—the enlargement and deformation of the abdominal rings, the practical destruction of the inguinal canal,—no one, I say, can doubt that all these unanatomical conditions are the chief factors in the occasional failure of the "cure" in adult cases. Now these conditions are largely nonexistent during early life; they are something superadded to the original hernia, and they are the conditions which represent the only real difficulty in performing the radical

Typical cases of hernia in children.

operation. Further, the tissues are healthy and heal well after operation; the nervous system, too, is more at rest than in adult life; last, and not least, there is less strain on the parts immediately afterwards, for the child has not to engage in manual labor, as have most adults, as soon as he leaves the hospital. For all these reasons, then, I urge the radical cure as being *specially indicated* in early life.

As regards the operation itself. I am not prejudiced in favor of any particular operation; but I am prejudiced against all operations which seek a cure from fixing the neck of the sac, twisted or otherwise, either in the canal or in the internal ring. A radical cure cannot be obtained, in my opinion, unless the internal ring is closed, and this is impossible so long as any part of the sac is retained within it.

Some operators appear to use the neck of the sac as a means of closing the opening from the abdomen, and even stitch it to some part of the canal. I think this is a mistake, for, though at first it may help to occlude the opening, especially when very large, it really makes perfect occlusion impossible. For the same reason, let me say *en passant*, I object to the common form of belt used for umbilical hernia,—a belt having a pad, in the centre of which is a mammilla-like projection, intended to occlude the opening through which the hernia passes: in fact, it really keeps the opening patent,—though it may control the intestine,—and thus does more harm than good.

It is said that a considerable number of cases relapse after the radical operation. But allowing this, are the relapses more numerous than after truss wearing? Bearing in mind how recently the operation for radical cure has been introduced, it is surely a poor argument that some cases relapse. Compare the statistics of ovariotomy of to-day with those of thirty years ago! Surgeons will doubtless gain dexterity, and learn more and more how to succeed in all cases, as years go on.

It is urged by the opponents of the radical operation that some fatal cases have been recorded. This is true: but it is to be largely explained by the nature of the cases operated upon. Up to the present time, though at least fifteen years have elapsed since the operation was established on its present basis, only the severer cases have been selected; those, in fact, which were quite beyond the reach of trusses, or those which, having been strangulated, left no choice to the surgeon.

It is almost certain that the mortality will be further and favorably influenced by the spread of Listerism: hospital statistics have been revolutionized, but they have not yet arrived at finality. My present plea is for radical cure, as routine treatment would *be quite untenable were it not for the Listerian teaching and practice.* I, for one, have no sort of doubt that surgery will continue to advance on the same lines; operations will, year by year, become safer and surer; not alone on account of more and more complete asepsis, but by reason of the increased dexterity which comes of frequent repetition. Antiseptic surgery to-day is a great advance on that of 1881, and aseptic surgery is a still further advance; the beginning, probably, of further changes in surgical science and practice, even more important than those wrought by antiseptics.

Of course, I have not arrived at my present position—the radical cure as routine practice in children over eighteen months of age—all at once, or without careful consideration of all the circumstances. In proof of this, I will only just say, that of my first four operations, done in 1881, on May 20, June 24, July 31, and August 19, two died; of these one died thirty-two days after operation (which was quite successful as such) of measles and diphtheria contracted in the ward; the other case, of tubercular meningitis, five days after operation. One other case, with a very large hernia, was only partially successful; though after a second operation a cure was effected some months later. In the partially successful case the size of the hernia was reduced considerably, and brought within the reach of a truss; failure was due to the use of catgut, and perhaps to want of skill and temerity. The cause of death in the two fatal cases was quite independent of the local condition, though set up, in one case, indirectly by the operation, and in the other by infectious disease, a risk which is never quite absent among operation cases in a children's hospital. In the case which was fatal thirty-two days after operation, the post-mortem examination afforded at least this consolation, that a cure of the hernia had been effected; the ligature around the neck of the sac was found just within the abdominal cavity, adherent to the margins of the ring, which, together with the inguinal canal, were firmly agglutinated by recent exudation. You will understand that it needed strong convictions to face such disappointing results as these at the very outset. Though greatly discouraged by these earliest results, I was firmly convinced that *the principle* was right, though

Typical cases of hernia in children.

the *technique* left something to be desired. At that time there was little or no outside experience to help me, for my operations were among the earliest practised on children for this deformity.

I performed my first operation in this hospital on May 20, 1881, using the Listerian method then in vogue,—viz., a carbolic steam-spray during the operation, with large far-reaching dressings of carbolized gauze, and a small drainage-tube in the wound. At that distant date, I contented myself with isolating the sac from the cord, drawing it down as far as possible, tying it with carbolized catgut, and then allowing it to spring back into the abdomen as far as it would go, after which the pillars of the external ring were tied and the wound closed. I continued this operation for some five or six years, before I learned that the sac itself was the hinderance to the complete closing of the hernial openings; then I modified the operation thus far, that I cut off the sac after tying it, and to this very simple plan of operating I have adhered ever since. Some of the details have been changed; thus, of course, I never use a spray; instead of being antiseptic I endeavor to be aseptic, and instead of catgut I use silk. Both for tying the sac and approximating the pillars of the ring thick silk is preferred to thin, and is not tied very tightly: in this way it does not tend to cut its way out, and thus its mechanical help is insured during a longer time.

To be a little more precise as to the operation, I may say that I make a sufficient incision parallel with Poupart's ligament, in such wise that its centre about corresponds with the external ring, which I carefully expose and lay bare, taking up all bleeding vessels with catch forceps. Passing a finger around the structures which pass out through the ring, I next look for the outlines of the sac among these structures, and carefully detach it from its surroundings with my fingers and a few touches of the scalpel. According as the hernia is large and chronic, so generally is the difficulty of isolating the sac from the spermatic cord and vessels, and from the displaced and often hypertrophied muscular fibres and fascial coverings. When the sac has been freed as high up as possible, it is pulled down as far as possible and then ligatured with thick silk without opening it, if it is found to be quite empty. If the sac contains any contents which cannot be reduced, the sac is opened and its adherent contents are then freed and reduced, after which it is ligatured as before, and the

ligature is cut off short. The fundus of the sac is now cut off, and the neck at once retires from sight, if it has been well freed from all external adhesions. All bleeding having been arrested, the external wound is closed by a continuous suture and covered with an aseptic gauze and collodion dressing; the stitches are removed on the eighth day, when in nineteen out of twenty operations the wound is found to be healed. A second dressing is applied and left on eight or ten days. The child is, of course, kept in the recumbent position. Immediately after operation I order a dose of opium tincture, one drop for each year of life, plus an extra drop for the operation. Very occasionally a second dose is needed the same evening; smaller doses are given when necessary for a day or two, the object being to keep the child physically and physiologically quiet.

As a contrast to the results obtained in my first four cases in 1881, and as bearing out my remarks on the bettering of the results of operation likely to be obtained as our experience increases, I will now give you the results obtained in the five years, 1893 to 1897 inclusive, which Dr. T. Lister, the registrar and pathologist, has worked out for me. He reports that ninety-two cases of non-strangulated hernia were taken into the wards during this period. Of these eighteen cases, for some reason or another, were not considered suitable for operation, and were sent out *in statu quo*. The remaining seventy-four cases were submitted to operation; of these sixty-nine cases were cured, two cases were relieved, and three cases died. Of the three fatal cases one died from local septic causes, one died from gastro-enteritis (not connected with the operation), and one died from whooping-cough and gastro-enteritis: the operation wound was perfectly healed.

As a special precaution to adopt, let me urge on you the importance of aseptic ligatures. Twisted silk for ligatures is not as easily sterilized as gauze. Such failures as I have had lately have resulted from the silk, commencing either in a buried suture or at some point along the external incision. Great care, too, is required in the choice of needles; they should be large enough to carry the silk without too much pulling; they must be free from every trace of rust, to which much boiling renders them very subject.

To sum up, notwithstanding an occasional fatal case (whether from intercurrent disease apart from the operation or from causes

directly dependent on the operation itself), an occasional failure immediately, an occasional relapse some months or years later, I consider the radical cure to be the right and proper course to advocate and to adopt, and the only one worthy of the surgical teaching of the time. To wait five years for a truss cure,—the average period during which a truss must be worn,—for a result which can be obtained by operation with even greater certainty in as many weeks, appears to me an unnecessary infliction on our patients.

Are there any temporary contra-indications to operation? In all cases, the child should be in fairly good health, both general and local; especially the local conditions should be good. I unhesitatingly defer operation, even in the most pressing cases, when the skin, for instance, is not sound. The presence of eczema about the nates or scrotum or penis should always be treated and cured before an operation is undertaken. Such a condition interferes with that strict asepsis on which primary union depends: it interferes, also, with the patient's comfort and that complete rest which are almost as essential as the asepsis itself. In the early times I found many of these children fractious and irritable, and it was then my practice to keep them in the ward for a few days, hoping that this irritability would wear off. Later experience has convinced me that the irritability is usually due to the dragging and worry of the hernia, and that it disappears very quickly after operation, and especially after a dose or two of opium. The bowels and rectum should be well cleared out before operation. Needless to say, that disease of any kind within the abdomen would be an absolute contra-indication to the operation. As needless, also, to say that such operations should only be undertaken as can be performed with all the necessary adjuncts of suitable operating-room, instruments, accessories, and have adequate care and nursing subsequently.

EXTENSIVE CARCINOMA OF THE LOWER LIP; RESECTION OF THE SUPERIOR MAXILLA FOR CARCINOMA.

CLINICAL LECTURE DELIVERED AT ST. MARY'S HOSPITAL.

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EXTENSIVE CARCINOMA OF THE LOWER LIP.

GENTLEMEN,—We have here a rather remarkable and destructive disease of the lip. (Fig. 1.) The greater part of the lower lip has in fact ulcerated away, yet a glance shows that the process is not simply ulcerative. Especially on the right side may be observed a large fungoid mass, indicating that the disease is primarily neoplastic. Palpation of the borders of the ulceration reveals, even on the side where there is no striking growth, a hard, infiltrated area between the ulcerated surface and the healthy tissues. The ulcer is indolent, secretes moderately an ichorous discharge, is not especially painful, bleeds if slightly brushed, and presents a somewhat papillary aspect. Palpation of the submaxillary region reveals two or three nodes the size of large beans, and several others are barely distinguishable and hence enlarged. The general aspect and health of the man are not changed.

So much for the *status præsens* of the disease. Let us investigate the circumstances of its *début* and its course. About eighteen months ago, without apparent cause, a sore was noted on the prolabium, chiefly remarkable in that it did not entirely or permanently heal. Later a little nodule, subject to slight soreness and irritation, was apparent. In the course of a year it had reached the size of a filbert and was slightly ulcerated on the surface. He then became anxious about it and consulted his family physician, who very wisely advised its removal. He, unfortunately, sought other advice, and the next adviser, observing this series of scars upon his right arm

Fig. 1.—Carcinoma of lower lip. (Before operation.)

Fig. 2.—Carcinoma of lower lip. (After operation.)

and forearm, evidently inferred them to be syphilitic and encouraged a belief in cure by medicine. He was put upon specific treatment, which was continued some five months, during which time the progress of the disease has been very rapid. We shall return to a discussion of these scars and the question of syphilis presently.

Let us next study the patient himself a little. He is a Scandinavian farmer forty-one years of age. His family history or heredity is good and presents nothing material to the case in hand. His own previous health has been excellent, with the exception of some trouble thirteen years ago with his right upper extremity, of which these scars are the remains. His account of this disease is not very clear, but the most material points are that the trouble started from some phlegmon on the back of the hand, and extended in the skin up the outer and anterior aspect of the forearm and arm to the shoulder, ending in several ulcerations, which were slow in healing and the final cicatrization of which he attributes to some medicine which he took for his blood. These scars are a little peculiar, roundish, from dime to quarter sized, smooth, slightly depressed, white, limited to the anterior and outer aspect of the right forearm and arm; elsewhere there are none.

Now, it is true that scars, being as it were the foot-prints of past ulcerative processes, often give more or less circumstantial evidence as to the nature of that process. But the characteristics of scars are the results of so many factors that it is exceedingly seldom that one may safely deduce the specific cause which produced them from a study of their character alone. The testimony of scars is often of decided corroborative value, provided they are especially typical and are supported by other direct circumstantial evidence. But, be that as it may, I should not regard these particular scars as evidence of a past syphilitic process.

1. They are absolutely asymmetrical. Ulcerations, especially as numerous as these, if due to a constitutional cause, and particularly in an upper extremity, apparently exempt from contributory causes, would be more or less symmetrical.

2. Their form is not at all characteristic of syphilis. Certain ulcerative syphilides are especially marked by scalloped and serpiginous forms, and in certain stages the centre may be pale and atrophic while the circumference still shows its relative youth by redness or pigmentation. At times such traces of the syphilitic pro-

cess, together with a symmetrical or special localization, may be strong but rarely infallible evidences of a syphilitic causation. These scars present nothing suspicious of lues, but, so far as we may judge from the meagre accounts of the patient as to the course of the disease which caused them and from their distribution, they appear to be the result of some non-specific infection of the hand and the resulting phlegmon, or doubtless of its management. They are, in my judgment, neither proof nor disproof of a syphilitic past; but the absence of any genital scar, the denial of any knowledge of infection or of the observation of any of the accidents of that disease, —for example, skin eruption, sore throat, mucous patches, etc.,— and the positive evidence of healthy offspring, lead me to believe that the man has never had syphilis. Be that as it may, we have further all too abundant proof that the disease of the lip is certainly not syphilitic.

Treatment for months with potassium iodide and mercury has not in the least checked its course; on the contrary, a suspicion might be entertained that the rapid ulceration may have been in some small degree hastened by it. In rare instances the best diagnostician may have a doubt as to whether a lesion be malignant or luetic, in which case he clearly ought to apply the touchstone of specific treatment. But I wish to insist, first, that such a course, particularly in the case of external lesions, is rarely necessary, because a positive diagnosis ought to be and usually can be made without loss of time; secondly, and especially, I would insist that two or three weeks are quite sufficient for its trial; indeed, as a rule, any syphilitic lesion likely to be mistaken for cancer will respond sufficiently to indicate its nature inside of a week. There can be no possible excuse for extending it to months.

A second reason for deciding that this lesion is not syphilitic is found in the character and course of the disease. Slowly, but steadily, and with increasing momentum, has this progressed during one and a half years, not by fits and starts. Then there is the hard, in places nodular infiltration, the papillary growth, the regional and late invasion of the lymphatics. Many other reasons more or less cogent might be given for the conviction that this is not syphilitic, but that it is—what you all at once recognize it to be—carcinoma of the lip. I may say that syphilitic ulcers of the lip are for the most part primary sores and comparatively rare. Indeed, malignant dis-

case of any other variety than squamous-celled carcinoma very rarely attacks this organ, while this form, the so-called epithelioma, shows a rather strange predilection for the lower lip, especially in the male sex.

About five or six per cent. of primary carcinomata occupy this location. In the table of Edmund Andrews the lower lip occupies the fourth place among the organs of the body as to frequency of carcinoma, being preceded only by the stomach, the uterus, and the female breast. However, according to the investigations of Andrews, in proportion to its surface extent or area, the lower lip greatly leads all other organs of the body in predisposition to cancer.[1] The upper lip is strangely immune, being at least one hundred times less frequently involved. Naturally, the lower lip is much more subject to irritation, yet the difference in this respect would scarcely appear sufficient to explain the striking difference in the relative predisposition of these two members to carcinoma. While prolonged irritation seems to be the best-established fact in our very meagre knowledge of the etiology of cancer, it is evidently only a predisposing or favoring factor, after all. The more proximate cause or causes are still unknown. The prognosis in cancer in general is exceedingly bad, yet it is in just this variety—that is, of the lower lip —that the greatest success has been attained and the largest percentage of lasting cures observed. (From twenty-five to seventy-five per cent. in different series of cases.) However, this holds good only provided the removal be early and complete. The location gives perfect opportunity for early recognition and easy, free removal, before generalization takes place, so that, if both patients and their advisers were to use due care and judgment and do their duty, doubtless nine-tenths of these cases might be cured. As it is, about two-thirds of the cases seek competent aid too late for the best results, for, though the early stage of lip cancer is often indolent, usually extending over several months and even sometimes to a few years, when it finally gets under way it is quite as malignant and unmanageable as the carcinomata of other regions.

The case before us is a little unusual in the age of the subject, only forty-one. The disease is most common after fifty, but I have

[1] A Study of the Location of 7881 Primary Carcinomata, etc., by E. Andrews, M.D., Annals of Surgery, vol. xi. p. 149.

within a year seen a very bad carcinoma of the lip in a man of thirty-five, who is now dying, despite two attempts at removal. In this case the prognosis is exceedingly bad. In the first place, the disease is far advanced: the lymphatics are clearly involved, and no one knows to what distance microscopic disseminations may already have taken place. In the second place, it has been my observation that the younger the subject the worse the prognosis. I cannot recall a good result from operation of a carcinoma which had clinically reached unmistakable malignancy in a patient much under middle life.

No, I have not the slightest belief in and only the faintest hope of curing this man. Yet we can, I believe, render him a very considerable service. We can widely remove the offensive and hideous ulcer, dissect out the infected glands, and by a plastic procedure close the cavity in his face. As we may do this with practically no danger to the little of life that is left to him, and send him home in a few days more presentable and more comfortable, I am very sure that it will be worth all the trouble many times over. I shall make the removal just as wide and as thorough and follow the infection up just as carefully as if I had more hope of a cure, because it may chance that our removal will be of more avail than we have reason to hope. If I am often discouraged by quick relapses in cases where I had hoped for better results, I must also admit that now and again I have had a long relief or a cure where I least anticipated it.

In the next place, to be of much use, even palliative operations for cancer should be locally complete. If we have immediate return *in loco*, the operation never does any good worth speaking of, and sometimes does harm by reducing the vitality and possibly goading the neoplasm to accelerated growth. If we prevent local recurrence here, we shall have rendered a very decided service.

On the left side I carry an incision from the border of the mouth downward and inward, reaching the mesial line slightly under the chin. This goes wide of the growth and removes about all of the lip and the soft parts down to the jaw. On the right our incision begins slightly external to the corner of the mouth and goes perpendicularly down to a little beyond the border of the jaw. Now we connect the lower ends of the two incisions under the chin, and all this large mass is dissected closely off the jaw. By a backward incision on each side under the jaw, we open up each submaxillary triangle and dis-

sect out all involved glands. This is the most tedious part of the work. Finally, having removed every discoverable trace of the disease, we survey the field and find that there is an unusual loss of substance. Practically all the lower lip and the major part of the skin of the chin down to and beyond the lower margin of the jaw are gone. On the left side we can easily bring up a large rectangular flap from the lower cheek and neck, which will contain on its inner surface and upper margin considerable mucous membrane, but on the right side any flap from below will be entirely devoid of mucosa. I will, therefore, take a quadrangular flap from the cheek above; it will have to be smaller and shorter than the other, as it must not encroach on the parotid duct, which I carefully locate before cutting. Having cut these flaps, I raise the one on the left and turn down the one on the right and stitch them together over the lower teeth and in front of the jaw. I next stitch the mucosa over the raw edge of the new lip to the skin, and draw the skin together over the remaining defects as well as possible, without too much tension. At last we have only a couple of small triangles left uncovered. We may close these with grafts or let them cicatrize, as we please. Inasmuch as they are beneath the jaw and of small extent, I hardly think I shall bother with grafting in this case. We will cover the wounds with a little iodoform collodion, keep the edge of the lip constantly smeared with borated vaseline, and apply a pad of gauze and bandage under the chin, but not up onto the lip, as saliva and discharges from the mouth would run into it.

The new lip and chin are not very beautiful, but, if the wound heals as well as I expect, I think you will agree that a most decided improvement has been effected. Of course, the great extent—I may say, the very unusual extent—of the loss of substance makes it impossible to get as perfect a cosmetic effect as if the disease had been limited to the lip. We have had to restore the lip and a good part of the chin and lower part of the side of the face, but all but a very small median portion of the new lip is lined with mucosa, and hence will not be a distorted and hide-bound affair. Of course, almost any amount of skin can be transplanted from under the chin and neck, but, unless we can get plenty of mucosa at the corners of the mouth and along the border sufficient to cover the teeth, there is not much lip about the new organ.

[Note.—Fig. 2, from a photograph taken ten days after the

operation, shows the immediate result. The patient left the hospital for his home, practically healed, on the fourteenth day.]

RESECTION OF THE SUPERIOR MAXILLA FOR CARCINOMA.

Case II.—Those who attended my clinics last year and were present at the operation may remember this case. Fifteen months ago I removed the left upper maxilla for a very extensive carcinoma which evidently started in the antrum. The symptoms first noted were nasal, and several pieces had been removed through the nose by successive operations. But the patient's condition kept getting worse, and when she applied at our clinic the whole left upper jaw appeared to be involved. The roof of the mouth bulged downward, the left nostril was completely obstructed, and a considerable tumor —the size of a hen's egg—pushed out through the anterior wall of the antrum. The pain was great and her general health rapidly failing. I regarded the case as probably past hope of complete removal, yet advised excision of the maxilla as a palliative measure. The superior maxilla was removed by the median incision, reflecting the upper lip and cheek outward, and after the jaw, which was a soft, friable mass, had been entirely removed, all suspicious tissue in the naso-pharynx and mouth was removed with scissors and curette. I am very agreeably surprised at the result. She recovered promptly, leaving the hospital in two weeks completely relieved of her suffering, and there is as yet no return of the disease. True, the time is still too short to speak of this as a cure, three years without recurrence being the limit usually assumed; however, most recurrences, and especially local ones, take place within a year.

Six days before this operation, I excised the upper jaw of a lady, aged thirty-eight, with a precisely similar growth, excepting that it was very much less extensive and of shorter duration. At the operation we were able to go wide and clear of all visible disease, while in the case before us I had scarcely a hope that this was accomplished. The first case healed rapidly, but in less than three months recurrence was already apparent and destroyed her life within six months. I am unable to explain this difference in the malignancy of different carcinomata in the same organ. Of course, there is possibly something in the particular growth itself, but probably it is chiefly in variations of the soil in which it grows that we are to seek the cause of these great differences in the malignancy of different carcinomata.

The only factor which seems to me very apparent is that of age. This lady is sixty years of age; the other was thirty-eight. Not long since a lady of thirty consulted me for a cancer of the breast. She had noticed nothing wrong until within three months, but the whole breast was studded with nodules. I advised against any operative interference as worse than useless. She, nevertheless, had it removed, and the operator informs me that she died three weeks later of general carcinosis, the autopsy showing dissemination to nearly all the viscera. While acute carcinosis is not limited to young subjects, and while at all ages the length and course of malignant disease are very variable, the general proposition that carcinoma in young subjects runs a more rapid and malignant course and becomes generalized very early, often before the primary lesion has reached an apparently threatening aspect, is, in my experience, so strikingly true as to be of much practical utility in selecting cases for surgical treatment and in counselling for or against operation.

As I have many times reiterated, palliative operations for malignant disease already past probable cure should be applied with much caution and good judgment and upon fairly definite principles. Unfortunately, a major part of the surgery of malignant disease can as yet only be looked upon as palliative. In the past it has been but exceptionally curative. With the earlier recognition and much more radical and scientific removals of the present, our cures are far more frequent. Still, it must be admitted that the great majority of our operations are at the best but palliations.

During the past two years I have had occasion to excise the upper jaw five times for carcinoma. In three the disease has already relapsed, yet in all but one I think sufficient palliation was secured to repay the trouble. Though a rather formidable operation, the mortality is not as great as is usually supposed. The recovery is astonishingly rapid, and, if it be plain that the patient may be rendered more comfortable, cleanly, and hopeful for several months, I think it is quite justifiable.

I doubt the necessity or propriety of preliminary tracheotomy or ligation of the carotid in these cases. After thoroughly anæsthetizing the patient by the morphine-chloroform method, so that the anæsthetic may be dispensed with from the first incision, lowering the head so that the blood may flow or be swabbed out of the mouth, rapidly turning back the cheek by this incision, extracting an incisor

tooth, cutting through the alveolus and hard palate with a single stroke of a sharp and strong bone-shears, severing the nasal and malar processes with the same instrument or with a chisel, then grasping the mass with a lion-jawed forceps or, if too friable, with the fingers, it is rapidly wrenched away, as a few touches of the scissors or knife divide the remaining soft patches. Pads of iodoform gauze pressed into the cavity for a few moments check the free and general bleeding, after which a more leisurely inspection and trimming with curettes, scissors, etc., complete the operation in a few minutes. Often not a ligature is used; hemorrhage is lively while it lasts, but, by adroit manœuvres in rapid operating and skilful pressure by the fingers of one's assistant, it is of very brief duration. The procedure, so far as excising the maxilla is concerned, is one of such absolute precision that a surgeon of experience and resource, sure of his technique, knows his power to execute it before dangerous bleeding can take place, and with the great cavity open before him he is absolute master of the situation. I regard as the great essentials of success in operating by this method (in some small respects, so far as I know, my own), first, a good and properly planned anæsthesia,—one-fourth grain of morphine half an hour before, then chloroform to complete safe narcosis, that the patient may remain without struggling until the operation is completed. Second, a proper position, with the head hanging over the end of a high table and resting upon a firm support so low that the blood will not readily enter the trachea. Third, rapid execution of the manœuvre above described, with few changes of instruments. The knife dissects back the flap and the assistant's fingers grasp it, another pulls the tooth, when, with three or four strokes of the bone-shears, the mass is ready for extraction. It was performed in this case quicker than I can describe it. Only when the friable, fungoid mass crushes and tears have I observed alarming hemorrhage. Then I have grasped it with my fingers covered with gauze and scooped it out, stuffed the cavity with gauze for a few moments, then uncovered parts of the cavity at a time and trimmed away at my leisure the remaining shreds of growth or suspicious tissue, the first thing being to convert the mouth, naso-pharynx, and side of the face from the tongue to the orbit into one great cavity; then we are in as absolute command of hemorrhage as in the incision of the lip itself.

Of course, I would not advise this rough and quick method in

Fig. 3.—Resection of superior maxilla for carcinoma.

every resection of the upper jaw, because it is not always necessary. We can sometimes take out everything in one nice piece, but in the cases I speak of the extensive growths bleed like rain, and it is necessary to make room to command the situation first and do your careful trimming afterwards. Here I do not stop to change instruments,—that is, a saw for the alveolus and hard palate, a chisel for the nasal palate, and all that,—but make as few motions as possible and make them count until the great cavity lies open before me. This can, if necessary, be done in less than three minutes from the first incision, and if the arteries of the lip are compressed it is scarcely possible for the patient to bleed dangerously during this time. No blood enters the trachea and little or none is swallowed.

[Note.—Fig. 3, taken fourteen days after the operation, shows the immediate result. The œdema of the lower lid soon disappeared, but the falling in of the cheek is now decidedly greater than appears in the photograph.]

GOITRE; ENCHONDROMA OF THE TESTICLE; CHRONIC CYSTITIS.[1]

CLINICAL LECTURE DELIVERED AT THE KENTUCKY SCHOOL OF MEDICINE HOSPITAL.

BY WILLIAM L. RODMAN, A.M., M.D., OF PHILADELPHIA,

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GENTLEMEN,—You will remember that six weeks ago I showed you a case of goitre in a lady aged thirty-five years, and at the time we decided that the case was not one for operation, and the patient, in fact, was not willing to have one performed even if we had thought it wise. She reported to me a few days afterwards, and I put her on a favorite prescription of mine for local application,—viz., the biniodide of mercury ointment, to be applied every morning.

The patient is now before you, and you will notice a wonderful improvement in her condition: the goitre has almost entirely disappeared under the local applications of the mercury ointment, the treatment extending over a period of about five weeks. You will observe that at one point a little irritation has been caused by the applications, and I believe a small abscess is forming. The goitre seems about cured. I feel satisfied that this is one of the cases in which we shall bring about a complete cure by local treatment.

You will find but few cases of goitre in this country, certainly nothing like so many as in some other parts of the world. In the Swiss Alps you may meet with a great number of such cases. Kocher operated upon his thousandth case when I was in Berne last summer.

The cause of goitre has not been satisfactorily proved. I asked Professor Kocher for his opinion, and he said he was not positive,

[1] Stenographically reported by C. C. Mapes, Louisville, Kentucky.

FIG. 1.—Sarcoma of testicle

but had a theory that it was connected in some way with the drinking-water. I presume that may be the case, but it is a disease of mountainous countries, and we have very little of it here.

Case II.—While the next case is being chloroformed we shall have a word to say about it. The patient is a man aged thirty-three years, and has had a slow-growing enlargement of the right testicle, which he says has given him little inconvenience except from the weight of the tumor. (Fig. 1.) The enlargement is pear-shaped, seemingly fluctuates, but has been aspirated twice, I understand, and the surgeons assured him that there was no fluid in the enlargement. If there be any fluid in the tumor, I take it that it must be at its upper portion. The chances are that the growth was originally an enchondroma; it is also quite probable that the enchondroma has broken down, and we may find some fluid, though the shape of the tumor resembles very much a hydrocele. There is one very weighty objection to the hydrocele theory, and that is that the testicle is at the bottom of the tumor, which is not the case in hydrocele, as the testicle is situated posteriorly at the junction of the middle and lower thirds. Here we have a tumor lying on top of the testicle, and the testicle is down in the bottom of the tunica vaginalis. Again, the fact that the tumor has been aspirated twice with negative results would seem to shut out the probability of hydrocele. This is almost certainly a benign growth of the testicle.

We have a great many tumors, as well as other swellings, of the testes. Of the tumors of the testicle proper, the most common of all benign growths is the enchondroma. The question has been asked why we see enchondromata so often affecting the testicle. It is just the situation where you would expect to find developmental errors which result in growths of this character. An enchondroma of the testicle is not, as taught by the older authors, strictly a heterologous but merely a homologous tumor growing from misplaced cartilage. It does not grow from the gland structure of the testicle proper, but it is the result of misplaced cartilage from the vertebral column, just as you would explain an enchondroma of the parotid gland by misplaced remnants of cartilage lining the glenoid fossa.

These enchondromata are strictly benign in their early stages, but there is a distinct tendency for them later on to undergo malignant or sarcomatous degeneration. They sometimes become malignant and generalize, affecting the entire system.

The next most common solid tumor of the testicle of a benign nature is fibroma; this, in my judgment, is rather rare. I have in my entire experience seen but two specimens of fibroma of the testicle. Then we have the cystoma, also the cystic adenoma, which is partly solid and partly fluid. You may meet with a great number of little cysts in a specimen of adenoma; some may be solid, others containing fluid; some may be very large, others small. This is rather a common tumor of the testicle, and I have seen a great many instances of it. I remember four or five that we have operated upon here within the last few years.

Of the malignant growths that you are most likely to find in this situation, cancer is by far the most common; next comes sarcoma. The two varieties of cancer most frequently found are scirrhus and encephaloid; the former grows very slowly and is painful; the latter develops very rapidly, is soft, and far more malignant than scirrhus or hard cancer. There are also two varieties of sarcoma,—viz., the spindle-celled and the round-celled, and, contrary to what some of the books state, sarcoma of the testicle is quite as likely to be followed by glandular enlargement as carcinoma. While in other situations both the round-celled and the spindle-celled sarcomata are considered only mildly malignant at times, you can scarcely conceive of a more malignant growth than the small round-celled sarcoma of the testicle. It will invade the lymphatic glands in the inguinal region as rapidly as a carcinoma and will often be more destructive.

Fatty tumors of the testicle may occur, but they are rare. They develop in the scrotal tissue, not from the testicle proper. Cases have been reported as occurring in the testicle, but incorrectly so, in my judgment.

You have a great many swellings here which cannot be considered tumors,—varicocele, hæmatocele, hernia, hydrocele, etc. In this case we have already excluded hydrocele: the testicle lies below the tumor; furthermore, hydrocele is a transparent enlargement. Could it be a hæmatocele? Certainly not; hæmatocele comes on in a few minutes, in a few hours at most; it is due to hemorrhage. A man receives a blow on the testicle; the blood pours out slowly, and a tumor forms in a few hours. This cannot, then, be a hæmatocele. Varicocele occurs on the left side most frequently, rarely upon the right, but the condition before us bears no resemblance to a varicocele. Could it be a hernia? It is in a situation where herniæ are

likely to occur. By grasping the tumor we are satisfied that it is not a hernia, because all herniæ, except strangulated ones, give you an impulse on coughing.

We shall remove the testicle with the tumor, transfix the cord, ligate the vessels, and close the wound.

Then comes the more important part of this case. The patient ten years ago began to have cystitis, not following the use of the catheter. The first symptoms were irritation about the bladder and frequent micturition. He had to get up very often during the night to pass his water, and urination was perhaps more frequent throughout the day. He had not had gonorrhœa up to that time. In January, 1896, he began to complain of pain in the left kidney or thereabouts. From his description I judge that the pain was such as might accompany nephritic colic, though I am not convinced that this was the trouble; the pain seems to be too persistent and not sharp and lancinating enough for renal colic. The history is rather obscure, but I can understand from his description that he may have passed renal calculi. There was no retraction of the testicle at any time; there was no sinking pain, such as characterizes the passage of a renal calculus; it does not answer the description of the pain usually accompanying the passage of a renal calculus; therefore I believe it is not that; yet I am free to say that it might be. For ten years he has had cystitis, which is getting gradually worse; he is up all night and all day emptying his bladder. Examination of the urine has thrown some light on the subject, but not as much as we might expect in such a case. It shows quite a large amount of albumen, a larger amount seemingly than would be accounted for by the cystitis, which is very important, for it indicates the possibility of a pyelitis, or trouble higher up than the bladder; the microscope also shows some blood-corpuscles in the urine. The urine is acid, which is another feature of importance; while it is not highly acid, —characteristic of the urine of pyelitis,—still it is distinctly acid.

So, then, we have a case of cystitis in a man, aged thirty-three years, without any previous history of gonorrhœa, and we are to ascertain the cause of it. Now, what would cause cystitis in a man of this age? The vast majority of cases are gonorrhœal, it must be admitted. He had gonorrhœa six years ago, but had not had it ten years ago, when the cystitis began. As there was no history of gonorrhœal infection at that time, and there was no history of acute cys-

titis, we have next to look to intemperance in drinking, or getting wet and becoming suddenly chilled, or improper eating, etc. There is no history of an acute cystitis from the above causes. As the trouble began ten years ago and has been getting worse all the time, he had from the first a subacute chronic cystitis, but at no time have there been acute symptoms, with chills, fever, agonizing pain, etc., such as are usually caused by acute cystitis.

The patient is before us; I have not sounded his bladder; you will ask me why we have not said something about vesical calculus. He has had some irregularity about passing his water: he says that the stream will often stop completely. This, as we know, is indicative of a stone in the bladder. I have not examined his bladder with the sound for the following reason: he only came into the hospital day before yesterday, and I did not want to use oil or throw anything into the urethra or lacerate it in any way until the gentleman who has charge of the case had every opportunity to collect his urine two or three times and examine it carefully, chemically and microscopically. I wanted him to have the urine as it came from the patient, and, further, did not want to risk causing catheter fever by introducing instruments into the bladder. Finally, I know perfectly well that exploration of the bladder without anæsthesia is very unsatisfactory; at least it has been so in my experience.

We will remove the testicle first; then I shall sound the bladder carefully, throwing in eight or ten ounces of boric acid solution. When I have satisfied myself that there is no stone, I shall wash out the bladder very carefully with warm boric acid solution. I shall dilate the urethra, because he has had gonorrhœa and there may be some little constriction of the canal, though there is probably no organized stricture. After doing that I shall wash out the bladder every day, and satisfy myself positively that there is a lesion higher up before I go into the kidney. There is no tumor in the kidney, although there is some tenderness at that point; there are no renal casts in the urine, certainly not enough to justify our doing a nephrotomy, but if later on this should be indicated we are prepared to do it.

Suppose I find a stone? In that event, of course, I shall immediately do a suprapubic cystotomy. Why should we use the suprapubic route? There are several reasons for so doing. If we operate by the suprapubic method we can remove the stone as well as by

the perineal route, and perhaps better; certainly this is true if the stone proves to be a large one. We can also catheterize each ureter, and in this way collect a sample of the urine from each, and can then demonstrate positively whether there is a lesion higher up, and if so, whether it is in the right or the left kidney. Therefore the suprapubic route is selected, and we will make our opening just above the pubes. Further, it is claimed that better drainage is made by the suprapubic operation than by the perineal. I do not believe that except in patients with enlarged prostates. In operating for enlarged prostate you will get better drainage above than you will below, because the bladder sags behind the enlarged gland and does not empty itself. On the other hand, in a patient of this age, if I were simply after drainage and nothing else, I would prefer the perineal route. However, in this case we have other things to think of. We want to ascertain the condition of the kidney, whether one or both are involved, the probable amount of involvement, and we can gain all the information better by operating from above than below. The mortality is no greater, and I therefore take it the suprapubic method is not only indicated, but will put us in possession of the desired facts.

If there is a stone in the bladder,—and we are neither prepared to affirm nor deny the proposition,—why has nothing been said about crushing it? That is really the operation which is indicated in the majority of cases of stone in the bladder. It is not very popular in this section of the country. In some sections the crushing operation is done with far greater frequency than any of the cutting operations; we are here partial to the cutting methods. In some cases crushing is not indicated. Litholapaxy is never a particularly safe operation where you suspect—certainly not if you know—there is a lesion of the kidney. You should never do the crushing operation where a patient has a damaged kidney. So in this case we would not think of using litholapaxy or lithotrity, even if we had positively diagnosticated the presence of a stone in the bladder.

How shall the sounding be done? It is comparatively an easy operation. Never sound the bladder when it is empty. The chances are that the patient will have passed his water, and before using the sound you should throw in six, eight, or ten ounces of water, or, what is better, warm boric acid solution; when the bladder is moderately full, introduce Thompson's searcher just as you would an ordi-

nary bougie; when it is in the bladder turn it to the left, then to the right, then tip the searcher up and down,—in other words, you try to circumscribe the cavity of the bladder in such a way that if it contain a stone you will strike it, you will feel it, you can hear the click; then, of course, you have positive evidence of the existence of a stone in the bladder. The click is the only reliable symptom in making a diagnosis of stone in the bladder; you will be misled by all others. The patient may pass bloody urine at times; he may have pain in the head of the penis or along the under portion of the urethra; he may have a constant seapage of water at times; he may have great pain after emptying his bladder, on account of the stone coming in contact with the inflamed portion, etc.: all these symptoms, however, may mislead you, and certainly no one should cut for stone until he gets the characteristic click, and even then he may be mistaken. There may be a tumor of the bladder incrusted over with phosphate or carbonate of lime, which would give a click; but this does not occur very often, and you hardly need take it into account.

I believe we will examine the patient for stone before removing the testicle. The kidneys may be damaged, and we want to get him under the influence of the anæsthetic as quickly as possible. We find very little urine in the bladder; he has done what most patients do, emptied his bladder beforehand. Introduce slowly four or five ounces of boric acid solution, which will be sufficient to operate with. We carefully introduce the solution into the bladder so as moderately to distend it. I show you here Thompson's searcher, which is a most excellent instrument. This being now inserted into the bladder, I turn it to the left, then to the right, then come down to the fundus of the bladder and explore the summit. I find no stone up to the present, but strike a ridge that might deceive one who had not sounded bladders before. Being reasonably sure there is no stone present, I turn the sound over to one of the most distinguished lithotomists in America and ask his opinion. You will find few men in this country who cut for stone as often as Professor Holloway. Twenty-five years ago Drs. Holloway and Yandell were the only operators in this part of the country who had operated for stone in the bladder. Of course, at the present time there are other Richmonds in the field, and it is not possible for a man to run up into the hundreds of operations now as they used to do. You will find surgeons in many of the smaller towns nowadays who will undertake to

operate for stone in the bladder. Professor Holloway, having examined the bladder carefully, agrees with me that there is no stone.

After we have removed the testicle I will dilate the urethra moderately, and flush out the bladder with warm water; then we are through with the bladder for the present. Later on we may do a suprapubic or a perineal section just for drainage if it seems necessary, but we will try milder measures first. It is our aim not to do operations unnecessarily, but do just as little as we ought, in order to give the patient the best chance for his life and health. We will wrap the penis with sterilized gauze. This is a precaution which is seldom taken, but it is necessary, as the penis might otherwise come in contact with the wound and infect it. It is always best where you are going to remove the testicle to shave the pubes, perineum, and thighs, just as you would before doing a herniotomy. You want to take no possible chances of sepsis. All precautions have been observed in this case.

An incision is made from the external abdominal ring down to the lower edge of the scrotum. I am now down to the capsule proper of the tumor, and am going to enucleate it. I find that it is a solid tumor; it is evidently an enchondroma which has undergone degeneration. The blood-vessels are very large, and hemorrhage is likely to be profuse. Having satisfied ourselves that the testicle must also be sacrificed, we have dissected up to the external ring and are now ready to ligate the cord. Dr. Weidner suggests that when this is done we watch the pulse. I have never seen any marked shock occur from ligating the spermatic cord, although I have cut a great many; other operators, however, have recorded the fact that great shock sometimes occurs from this act. You observe that I take the precaution to clamp the cord in addition to ligating it; I do this so as to be sure that I am master of the situation. Hæmostasis seems to be perfect. Let me enjoin one thing upon you,—viz., always be sure that you tie the ligature well when ligating the spermatic cord. I almost lost a patient once on account of the carelessness of a house surgeon of one of the infirmaries of our city. He telephoned me to come to the infirmary at once, and upon reaching there I found the patient almost moribund from secondary hemorrhage. I turned out the clot, which was as large as a child's head, and the man made a good recovery. You should be very careful in ligating the cord in

all cases. The wound seems to be absolutely dry, and we rapidly proceed to dissect the tumor, together with the testicle, loose up as far as the external abdominal ring. The cord is thoroughly exposed, is transfixed, and with a silk ligature I tie half one way and half the other, then go all the way around the cord again; in this way we are certain that all the vessels will be included. I prefer this to some of the more modern plans of isolating the three arteries from the cord and tying each separately. You have here the spermatic, vas deferens, and cremasteric arteries, all of which are easily found and isolated. The spermatic artery lies in front of the pampiniform plexus of veins, the artery of the vas deferens of course is with the vas, and the cremasteric is also very near the artery of the vas deferens. I see no advantage whatsoever in isolating and ligating these vessels separately. The other plan suits me well enough, and, while I have often taken time to isolate these vessels and tie each separately, not having been convinced of the necessity of it in former operations, I have discontinued the practice.

Another point of importance is whether you shall use silk or catgut in ligating the cord. I prefer silk, and if it has been properly sterilized you will have no trouble from it. I would rather trust to silk than catgut in this situation. We are now closing the wound by interrupted sutures of silkworm gut. If there seems to be any indication for drainage we shall make it; but at present I see no indication for it, and we shall therefore close the wound completely. I want to get union by first intention, and expect such to occur. In suturing the scrotum, unless you are very careful to hold the skin up and properly approximate the edges, you are certain to have skin to skin instead of the cut edges brought together. It is held for me by an assistant with retractors, and therefore I secure accurate coaptation. We are very apt to have secondary hemorrhage after an operation of this kind, on account of the extremely lax tissues. I knew of two patients who almost bled to death after castration. The wound seems to be perfectly dry, and we will close it without drainage. We will dust the wound with iodoform, because it is in the septic region of the body.

In differentiating between the different tumors of the testicle a few minutes ago, I purposely said nothing about tuberculous epididymitis. That is not a tumor. A swelling is not a tumor, as formerly taught. Tubercular epididymitis is a disease which always

Fig. 2.—Sarcoma—tumor.

begins in the epididymis; I have emphasized that point time and again.

I am going to dilate the urethra equably and make good free drainage through this channel, and shall hope to cure the cystitis in this way. I believe a cure will be thus effected unless the disease is prolonged by a complication higher up, in which case a different procedure will have to be adopted.

You will observe that the tumor is a very large one; that it presents many of the characteristics that I told you benign growths would present. It is hard, whitish, and lobular at certain points. We will turn it over to the microscopist, and, while we are still of the opinion that it is an enchondroma, we will await a report from the pathologist for a final opinion.

[Note.—The report of the pathologist, made several days afterwards, showed the tumor to have begun undoubtedly as an enchondroma, but to have possibly degenerated into a sarcoma at certain points, which are soft and show suspicious cells typical of embryonic connective tissue. (Fig. 2.) Therefore the tumor may return, though, even if there are limited sarcomatous changes, its thorough encapsulation would make it practically a benign growth. I do not expect it to return.]

Gynæcology and Obstetrics.

THE USE OF ELECTRICITY IN SURGERY.

ILLUSTRATED CLINICAL LECTURE DELIVERED AT THE LONG ISLAND COLLEGE HOSPITAL, BROOKLYN.

BY ALEXANDER J. C. SKENE, M.D., LL.D. (Aberdeen),
Professor of Gynæcology in the Long Island College Hospital, Brooklyn, New York.

Gentlemen,—The galvano-cautery has been employed in surgery for many years, and has a well-established reputation in the treatment of malignant diseases of the uterus.

The electrolytic treatment of certain neoplasms has also a well-deserved position in surgery. In my own practice the galvano-cautery has supplanted all caustics. The stick of nitrate of silver, nitric and chromic acid were all laid aside years ago for the galvano-cautery, which accomplishes all that the other agents did, and with less trouble to the surgeon and vastly less suffering to the patients.

During the past few years I have extended its use to controlling bleeding vessels. I had long known that compression and heat were the best hæmostatic; far superior to any kind of ligature. The practical application of the heat element of the process was so difficult as to render it impracticable.

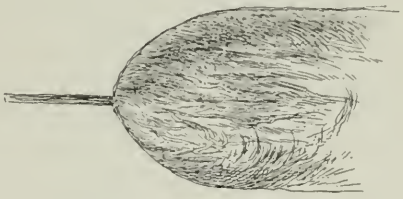
With the aid of the distinguished electrician, Mr. Louis M. Pignolet, I have succeeded in devising instruments and appliances that work to perfection, as I shall presently show you.

Hæmostasis by this method is accomplished as follows: The divided artery is seized with a forceps and strongly compressed; one blade of the forceps in contact with the artery is heated to a degree sufficient to desiccate the tissues, but not char them. This effectually arrests bleeding, and leaves the stump or end of the artery clean, dry, and reduced in size about ninety per cent. Fig. 1 shows an artery after treatment. Fig. 2 shows the pedicle of an ovarian tumor after treatment.

The pedicle of an ovarian tumor and the broad ligament of the uterus are treated in the same way as an isolated artery, only stronger and larger forceps are used. This process of controlling hemorrhage in surgical operations is exceedingly simple and most satisfactory in

Fig. 1.

Fig. 2.



results; but the instruments and appliances are peculiar, and therefore I shall give Mr. Pignolet's description of them, so that you may understand their action in my illustrative operating.

The construction of the hæmostatic forceps is plainly shown by the illustration, of which Fig. 3 is a side view. Fig. 4 is a section of the jaw on an enlarged scale, and Fig. 5 is a top view of the chamber in the jaw, also on an enlarged scale, showing the arrangement of the heating wire. A flat case (A) of sheet-metal is attached to the inner side of one of the jaws (B) of an ordinary compression forceps in such a manner as to form a water-tight chamber. The heating wire (C), for heating the sheet-metal face of the jaw, is of platinum or other suitable metal, and is insulated from the walls of the chamber by a fire-proof material. One end of the wire is electrically connected to the instrument, and the other to a copper wire (E) passing out of the chamber through an insulating bushing (F) in the back of the jaw. The copper wire extends back to the handle of the instrument and is insulated by a water-proof covering. Terminals are provided at the end of the copper wire and the handle of the forceps for making connections with the flexible wires or cables which convey the electric current to the instrument. The path of the current is through the copper wire, and the wire in the chamber, and one blade of the forceps. By this method of construction the heat is concentrated upon the inner surface of the jaw, and the electrical energy necessary for heating is reduced to the smallest possible quantity, varying from ten to thirty watts, according to the size of the forceps. The required degree of heat, which is from 170° to 190° F., is attained very quickly, owing to the closeness of the heating wire to the

face of the jaw. The instruments are water-proof, and can be sterilized in the same manner as the ordinary forceps.

On this principle, forceps of various shapes, from the largest to

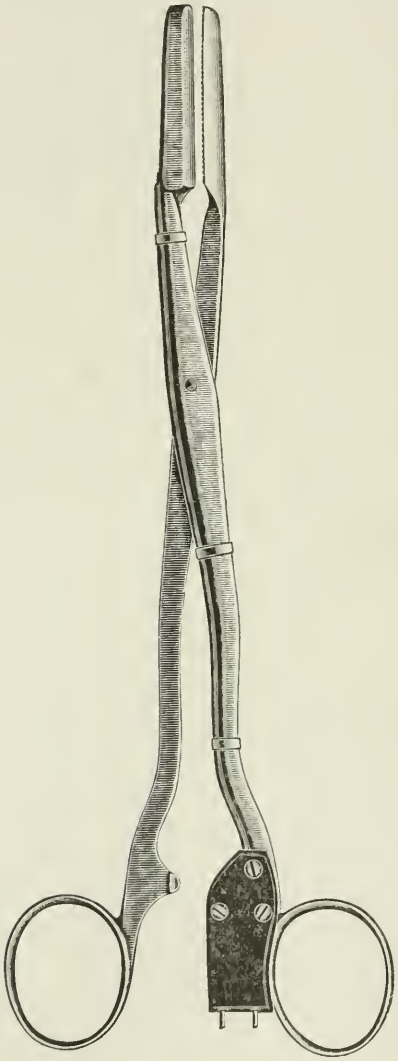


Fig. 3.

Fig. 5.

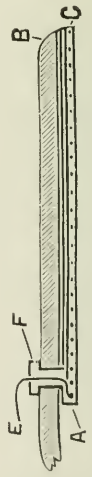


Fig. 4.

the smallest sizes, are heated, as the general formation of the instruments is not modified by the heating attachments.

The heat developed in the forceps depends upon the strength of the electric current and the resistance of the heating wire. The

current required to properly heat each forceps may be ascertained by trial and marked upon the instrument, or all the forceps (both large and small) may be so constructed as to be heated to the required degree by a current of a predetermined strength, by suitably proportioning the resistance of the heating wire. A small amperemeter included in the electric circuit measures the current received by the forceps, and enables the current to be regulated to suit by means of a rheostat or other controlling device. The heat of the jaw is thus controlled with certainty as the current required by each forceps is known, as explained above.

The length of time during which the forceps should be heated varies from thirty seconds to two and a half minutes, depending upon the thickness of the tissues compressed between the jaws of the instrument. It is advantageous to give the forceps a slight excess of current for a few seconds at the commencement, as this hastens the desiccation of the tissues and shortens the time of application. If, for example, ten amperes be the current required to heat the forceps to the proper degree, start with twelve amperes and decrease to ten amperes after the lapse of a quarter or a third of the time during which the current is to be applied.

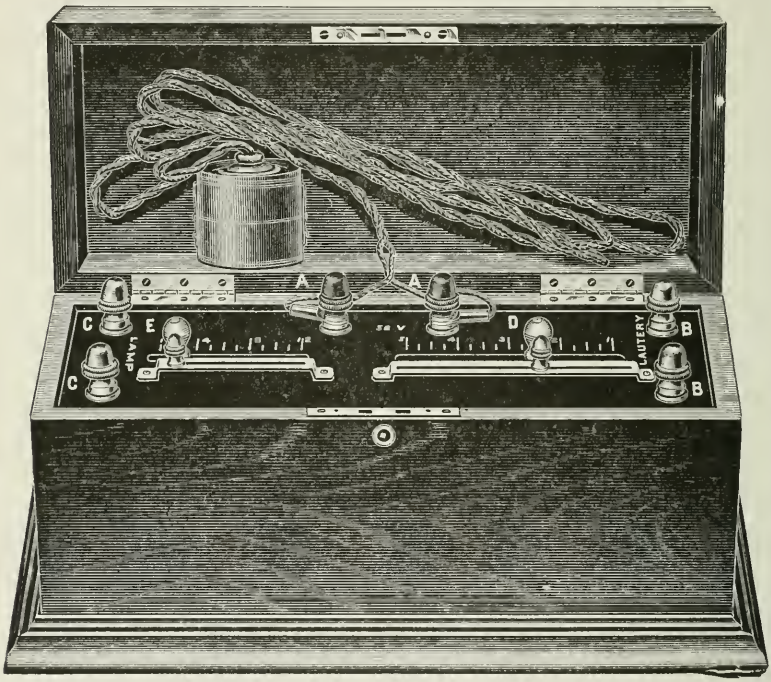
Progress in the practical application of electricity in surgery is hindered by the unreliable generators of electric power. All know how troublesome primary and storage batteries are. They may be dispensed with by utilizing the electric-light current if its pressure be reduced by some device. If the current be alternating and of the pressure used for lighting buildings, it is converted into a current of lower pressure, adapted for the forceps, as well as cautery-knives and lamps, by means of a small transformer capable of giving current of different strengths and pressures. The current is generated in a coil of wire, called the "secondary," by the inductive action of the lighting current passing through an adjacent coil called the "primary." The two coils are carefully insulated from each other, so that there is no danger from the comparatively high-pressure lighting current, as it cannot pass from the primary to the secondary. A further advantage of the transformer is that it increases the quantity of the current available as well as reduces the pressure, so that a current of large quantity (but low pressure) can be obtained without overloading the smallest electric-light wire used.

The pressure is varied to suit the forceps or other device by cut-

ting a sufficient number of the turns of secondary wire in or out of the circuit by a switch, or by altering the strength of the inductive action upon the secondary coil by moving it to a place where the action is stronger or weaker, as a greater or less pressure is desired.

A convenient form of transformer constructed according to the latter method is illustrated by Fig. 6. The flexible cable conveying

Fig. 6.



the electric-light current is connected to the binding-posts A, the cautery electrode to B, and the incandescent lamp to C. The current is regulated by sliding the knobs D and E, which control the cautery and lamp coils respectively, towards the centre of the instrument to increase the pressure and quantity, and *vice versa*.

If the electric-light current is continuous, it can be converted into an alterating current suitable for operating a transformer by a small dynamometer.

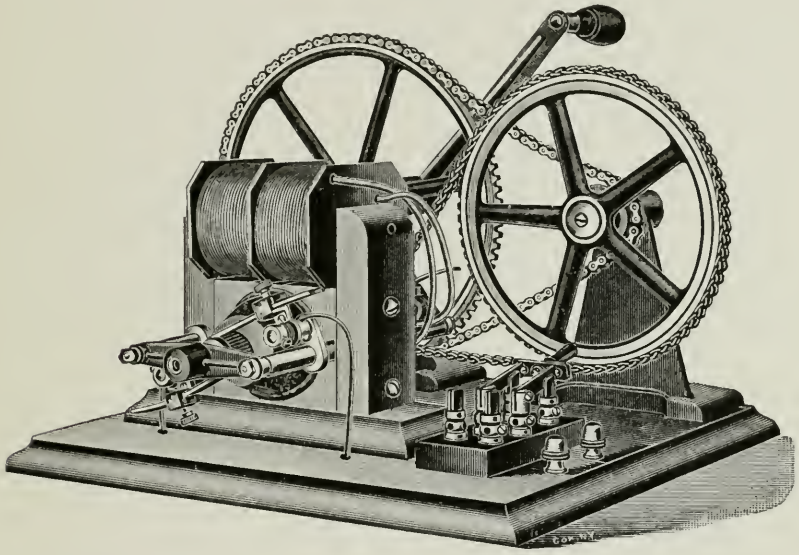
The current from the electric-light mains can be used directly, without the intervention of a transformer, if it be controlled by a rheostat. But this is not advisable; for the high pressure of the

current might cause a dangerous arc or a shock under certain conditions arising from some disarrangement of the apparatus.

A portable generator of electricity which would be as reliable as the ordinary dynamo is an important requirement for medical and surgical purposes where electric-light current is not available. This necessity led to the construction of a small hand-driven dynamo for use in such cases.

A very convenient portable storage battery has now been made by Mr. Pignolet, and is used in place of the dynamo here described. The machine is represented by Fig. 7, and is a convenient and re-

Fig. 7.



liable means for heating hæmostatic forceps as well as cautery electrodes, and for lighting small incandescent lamps. It requires no attention, except an occasional oiling, and is less liable to derangement than an ordinary electric-light dynamo. The dynamo, which has a very high efficiency for a small machine, was specially designed for the purpose, and is driven by sprocket-wheels and chains, as shown by the illustration. The armature is provided with two separate windings, each with its individual commutator and brushes for collecting the current. Each winding is capable of generating a current of fifteen amperes at a pressure of from one and a half volts to three volts, according to the speed of the armature.

A switch is provided for connecting the windings together in parallel, to double the quantity of the current, or in series to double the pressure. In this way a current may be obtained of large quantity and low pressure, such as is required for cautery electrodes, as well as the current of smaller quantity and higher pressure needed for small lamps and other apparatus. Thus the machine will furnish a current of any pressure, from one and a half volts to six volts (and even slightly beyond these limits), which is sufficient for all ordinary uses.

A small voltmeter, or an inexpensive galvanometer, connected to the circuit enables one to keep the current at any desired strength. The operator notes the deflection of the pointer of the instrument, when the lamp or other device connected to the dynamo is working properly, and regulates the speed so as to keep this continuous.

VAGINAL HYSTERECTOMY FOR CARCINOMA UTERI.

This patient is not sure about her age, but believes that she is fifty-eight. She has had a number of children. The menopause came six years ago. A discharge from the vagina began seven months ago and has continued ever since. This discharge has been watery in character and pinkish in color at times, and at other times more like a hemorrhage. She consulted her physician less than a month ago, who curetted the uterus, removing a quantity of fungoid material that was pronounced to be carcinomatous by a pathologist of good repute.

The discharge has continued. At the present time I find the uterus much larger than it should be in one of her age. The os externum is dilated, and the canal of the cervix (and the body also presumably) is filled with a mass that looks like epitheliomatous material. The uterus is movable, and there is no evidence that the disease has extended to the tissues adjoining the uterus.

According to the highest surgical authorities of the present time, total extirpation of the uterus is called for.

Operation.—The preparation of the patient for operation has been as usual in our practice. Placed in the lithotomy position, the perineum and anterior vaginal wall are retracted, the vagina is circumcised with the galvano-cautery knife; the incisions in front and behind the cervix uteri extend outward on either side about half an inch. Observe that the knife is placed in contact with the tissues

before it is heated. This prevents hemorrhage and cauterizing the adjoining parts. The incision with the cautery is limited to the vaginal wall, and does not include the peritoneum and subperitoneal tissue. The bladder is separated from the uterus with the dry dissector, and the peritoneum is opened posteriorly, but not in front. The cautery forceps is made to grasp the broad ligament on the right side as far up as can be while the peritoneum is intact in front. A sponge in a holder is passed up behind the forceps to keep the intestines or ovaries out of harm's way. A better protection to the vagina and viscera has been secured in the invention of a special shield forceps which enclose and insulate the heat forceps. The electricity is turned on and continued for about two minutes, and then the ligament is divided between the forceps and uterus and the forceps removed. The lower part of the ligament on the left side is treated in the same way. Then the peritoneum is opened in front, the uterus drawn down, and the remaining portion of the ligaments, including the Fallopian tube, clamped with the forceps and desiccated with the electric heat and divided. If it is necessary to remove the ovaries and tubes, the middle portion of the broad ligament should be treated and divided; and then the ovary and tube drawn down and the upper portions of the ligaments and the ovarian arteries compressed, heated, and divided. The uterus being thus set free is removed.

The next step is to close the wound in the vagina. This is accomplished by uniting the peritoneum to the upper margin of the vaginal wall with catgut sutures. The anterior vaginal wall and peritoneum are united in the same way. The peritoneum is now sponged clean, and the posterior and anterior vaginal walls are brought together by cutting short one end of each suture and tying the long ends on the opposing sides together. This closes the vagina completely, but leaves the portion divided with the cautery-knife open, so that when the charred tissue separates it is taken up with the dressings or is discharged through the vagina. A lightly applied gauze tampon is introduced and left in place for a few days.

The after-treatment is rest, and no medicine unless called for by disturbances that may arise. The tampon should be changed on the third day, and the bowels moved by a mild laxative aided by a saline enema, if necessary. If the future progress of this case is the same as others operated upon in the same way, there will be no pain, no constitutional disturbance excepting a rise of temperature of one

degree at the end of the first twenty-four hours, and again on the sixth or seventh day, and no discharge until the fourth or fifth day, when the charred tissue in the open portion of the vaginal wound separates. This discharge, a very slight one, may continue until the tenth day.

At the end of two weeks recovery should be complete and the patient ready to leave the hospital, though she may remain somewhat weak from her confinement.

ANGIOMA OF THE URETHRA.

This patient is a spinster thirty-five years old, of remarkably fine physique, who has enjoyed good health most of her life. Two years ago she began to have pain during urination. There was also tenderness at the meatus urinarius. These symptoms gradually increased so that her suffering became unbearable. She consulted her physician, who said he found a vascular growth in the urethra, and treated her with a caustic application of some kind. Very likely nitric acid or nitrate of silver.

The pain caused by the treatment was very severe, and continued in a diminishing degree for ten or twelve hours, but when it passed off she was much relieved for about two weeks. Then the pain and tenderness gradually returned. The treatment was repeated about once in every six weeks during the past year, each time giving a little temporary relief, but no more. To-day she states that she is worse than ever she has been. The diseased part has become so sensitive that she cannot endure the slightest touch; even bathing is painful.

You can see that the meatus is dilated, and occupying and protruding from it is this vascular tumor of a bright red color. The line of demarcation between the neoplasm and the normal mucous membrane is clearly indicated by the marked difference in color between the two. I am sure that this is an angioma or vascular neoplasm that is very much the same as a rectal hemorrhoid in genesis and histological composition. It is necessary to make a differential diagnosis between this tumor and the vascular growths so often seen in this location that are vascular hyperplasias, caused by inflammation of the ducts of the urethral glands. I am able to make a correct diagnosis in this case by inspecting the mouth of the ducts, which you, who are near enough, can see are free from disease.

The treatment is thorough and complete destruction of the diseased part, and this can only be accomplished by the use of the galvano-cautery. The patient, while begging piteously for relief, naturally dreads the pain of the operation. By way of encouragement, I have assured her that she will be made perfectly well (a rash promise for a surgeon to make and yet justifiable in this case), and that the pain of the operation will not be half so great as that caused by her former treatment.

First I apply a two-and-a-half-per-cent. solution of cocaine in the form of spray, thrown with little force at first. The application is continued until the color of the tumor is reduced to a pinkish white, which indicates that the sensitiveness is lessened. I now take the fine cautery point and apply it cold to the centre of the mass to be removed, the current is turned on, and the cautery heated to a bright red color. The cautery is held in place by slight pressure until it burns its way through to near the upper side of the tumor; it is then slowly moved around, working from the centre to the circumference of the mass or tumor.

Operating in this way saves the normal tissues of the meatus from being touched by the cautery. To make perfectly sure of doing no harm, a retractor may be placed between the normal tissue and the tumor. An ear-scoop answers the purpose, if a urethral speculum is not at hand.

The part of this procedure that I especially wish you to note is the application of the cautery to the tissues before heating it. If the cautery is heated and then applied to the tissues, bleeding is sure to be started, which makes the further use of the cautery impossible. My friend Dr. John Byrne, who knows more about the use of the cautery than any man living, taught me this part of the technic of galvano-cauterization, and it has been most valuable to me.

The patient did not flinch, you observed; not that the operation was without pain, but because the pain is so very much less than she has suffered on former occasions.

The patient rested for half an hour in the waiting-room, and on leaving the clinic she remarked to her friend that she had not been so free from pain in two years as she was at that moment. The fact is that the destruction of the tissue by the cautery is so quick and complete that there is less pain at the time and afterwards than is caused by caustics.

I wish you to observe that two very different effects have been produced by the galvano-cautery. In the hysterectomy the broad ligaments were only desiccated, not charred or burned up. That was done to prevent hemorrhage, just as a ligature is used. In the other case, the neoplasm was completely destroyed by a higher degree of heat.

I shall now show you another therapeutic action of the cautery in the treatment of ulcers. In the treatment of ulcerated surfaces, the object is to coagulate the albuminoid and destroy all septic material in the ulcer. This is done by a brief application of the cautery at a dull red heat.

FISSURA IN ANO.

This patient is suffering from a small fissure or ulcer in one of the folds of the mucous membrane within the grasp of the sphincter ani muscle. This fissure is exposed by the aid of the rectal speculum. The cautery is placed at the upper end of the fissure and heated, then drawn downward through the surface, and you observe that the diseased area is completely but very superficially cauterized. The cautery should be very lightly applied, to prevent deep destruction of the tissues, which would cause a slough and retard healing. In many cases, when the ulcer is superficial, I do not touch the parts with the cautery at all, only hold it near enough to produce the effect desired by the radiated heat.

THE MENOPAUSE.

BY GEORGE K. FRINK, M.D.,

Attending Physician and Surgeon to Magdalen Asylum, and formerly to the California Maternity Hospital and Children's Nursery, and to the Florence Crittenden Home, San Francisco, California.

The menopause, commonly known as the "change of life," climacteria, critical time, and turn in life, is a disease occurring in women, about middle life. Although from forty-two to forty-five is the average age at which the change occurs, I have seen cases from thirty to sixty years, inclusive. The changes which occur in the organs of generation constitute a complete involution, just the opposite to that which takes place at puberty. The latter is the beginning, the former the ending, of functional life.

There are two stages to this change, first, the precessation period, from the beginning of involution and the decline of functional activity to the end of menstruation; second, the post-cessation period, from the end of menstruation to complete involution and the adaptation of the general system to the new conditions.

The changes are atrophic in character: the ovaries and Graafian follicles diminish in size to such an extent that their former position is finally indicated by fibrous and cellular tissue only. The same may be said of the tubes. The uterus is reduced in size to that of an infant, and the vagina becomes shorter and narrower. The blood-vessels undergo a like change of size, and give very little idea of their former function. During the precessation period the flow is very much diminished at times, while at others it is a profuse hemorrhage.

At this period of life, even with the healthiest of women, disorders and disturbances of a disagreeable character are looked for, especially of the nervous system and nutritive organs.

With some few women the period of change is of short duration, and attended with but few of the ills characteristic of the period, while with others years of suffering, both physical and mental, must

be borne before a return of health comes to make life worth the living.

The lymphatic temperament is the most easy of change, while the bilious temperament predisposes one to disorders of the liver and stomach, the former especially. At this time of life, the tendency to stoutness is very marked, and commences generally at the level of the pubes.

Etiology.—The conditions of change in this disease have been discussed time and again; but, stated briefly, they are due primarily to the atrophy of the organs of generation. While the system for thirty years or more has been subject to excessive demands upon it, due to menstruation, marriage, pregnancy, lactation, and in many cases abortion, and while it has more or less conformed to these conditions, we now have the waste of menstruation, as well as the other excretions, with its nervous phenomena, thrown onto a system weakened from old age, work, and worry.

The excess of work is now thrown upon the liver, kidneys, lungs, and heart, and nature naturally rebels. We all know the close relationship existing between the liver and the excretory system, and the complications which are caused by constipation at any age of life in the abdominal and pelvic cavity, and the reflexes to the other portions of the system. How much more aggravated would these conditions be when we have the added burden of cessation of menses and its attending disturbances to contend with. I claim that the greatest share of the excess of work is thrown primarily upon the liver, and secondarily on the nervous system, the kidneys, lungs, and skin assisting.

As the liver is the main scavenger of the body, the increased action necessarily is affected first and the stomach secondarily; and we have reflex symptoms and pathological conditions of that organ. This being the condition of affairs, I claim that the treatment of this disease should be directed primarily to the liver and nervous system, and secondarily to the organs of secretion and excretion, as the symptoms of the patient may indicate.

It requires, on an average, two and a half years for the menstrual flow to cease. In dissections of old women we find that not only the genitals atrophy, but the hypogastric plexus also. The opposite condition may be seen in the child, and can be easily dissected out. The nervous supply to these parts is from the solar plexus and renal

plexus and sympathetic lateral chain. The atrophy of this nervous system causes, as it were, an anastomosis of the nervous supply after the menopause, setting up functional disturbances which are so characteristic of the period.

The flushes are a disturbance of the vasomotor centres, and flashes are a disturbance of the heart-centres due to the unbalanced irritation of the heart and motor-centres.

Eighty per cent. of women suffer from nervous irritability and from flushes and flashes; probably fifty per cent. of the remainder from deranged sensations, hyperæsthesia and anæsthesia; forty per cent. from headache, abdominal pain, and perspiration; while the remainder from sudden flooding, leucorrhœa, and sweats, showing that all the secretory apparatus of the skin, mucous membrane, and centres are deranged.

Vaginitis may be present, and some peripheral nerves may be exposed. The menopause comes on as slowly as puberty, the symptoms depending on the number and character of the pregnancies and abortions and their treatment.

Malignant disease at this time is not as common as nervousness, neuralgias, disordered circulation, indigestion, and all neuroses.

Atrophy is a disease just as much as hypertrophy and inflammation. A characteristic phenomenon of the menopause is an unbalanced, unstable nervous system, cerebrospinal and sympathetic.

Debility characterizes the trouble in the ganglionic system, while irritability characterizes the cerebrospinal axis, and excessive sexual desire is indicative of disease.

Symptoms.—A long list of diseases occurring at the menopause could be given, covering nearly all the ills that flesh is heir to, but the most common are nervousness, neurasthenia, headache, occipital, vertex, and frontal, in the order named, biliousness, depression, feeling of heat starting at the feet and going towards the vertex, as a rule, and occurring from a few to many times a day; this feeling may commence in the hands and go to the vertex; flushing of the face, sudden changes of temperature, general irritability, sluggishness of the mental faculties, gastro-intestinal symptoms, and impaired nutrition, which generally lasts throughout the disease.

It is claimed that if one suffers at puberty, she will suffer now. This I hold not to be the rule. I believe it is influenced somewhat by the sexual life led, the number and character of the pregnancies,

and especially the number and character of the abortions and their treatment.

Irregular menstruation, a feeling of goneness, giddiness, fear of being alone, loss of confidence, shooting pains in the back and loins and down the legs, palpitation of the heart, asthma, and feeling of being pregnant other than from the husband are some of the symptoms.

During this period we have increased excretion of the skin and kidneys, and also the lungs and other excretory organs, in some out of all proportion to the normal. Women leading fast and fashionable lives are more prone to suffer at this time than others, especially their nervous system, some taking to drink, while many are sent to the insane asylums.

Diseases and disorders of this period may be classified as follows:

1. Premature menopause, due to operations, as removal of uterus or the ovaries, or both; certain conditions of the sexual organs and general diseases of the system.

2. Prolonged menstruation due to local or constitutional symptoms or affections.

3. Conditions of the nervous and nutritive systems, and the sexual organs due to the menopause.

Cases are met with in the above classification in all sorts of forms and complications, some authorities claiming that they have no relation to the menopause, and would occur if there was no predisposition to any disease favoring an outbreak at this time, and that no notice need be taken of these affections, as they are common to all periods of life, the menopause acting only as an exciting cause for their development.

In some few cases little or no treatment may be needed; but the majority need attention in one form or another.

I for one do not believe in the bearing of unnecessary pain which can be helped, and may be cured, and in the one under discussion I believe much can be done to relieve and palliate and make life worth living.

Surely women have enough pains and aches from their many obligations of wifehood and motherhood for us to give them all the alleviation in our power. We should ever be on the outlook for that which will make their paths pleasant.

In the present disease I think it a disgrace to our noble profes-

sion, and *brutal* in the extreme, to tell patients that nothing can be done for them, that they must be patient, and as soon as the change is over they will be all right. *Shame* on such *advice!*

The essential feature of the menopause is imperfect uterine nutrition, and ovarian tumors grow more rapidly at this time. It would appear that the branches of the hypogastric plexus to the bladder and rectum are not atrophied to such an extent as those going to the genitals.

Treatment.—Inflammation of the genitals is common; eczema of the vulva is frequently seen, and is due in many cases to climacteric diabetes. An ounce of hypophosphate of soda to the pint of water locally, and heavy doses of opium will relieve. Endometritis and inflammation of the ovaries is another common condition.

Curetting and painting the parts with a weak solution of iodine, also glycerin tampons twice weekly, and *hot* douches up to ten quarts daily (the more water the better) is good treatment. Iodine and glycerin added to the water increase the efficiency. A little thing, but often forgotten, is to anoint the labia, rectum, and buttocks freely with vaseline or some clean grease, as lard, so as to prevent the hot water burning the external parts. This is often forgotten, and accounts for the objection of so many women to hot douches. I prefer a syringe to a douche bag, as with the former you can absolutely control the temperature, which is an important item and also often forgotten. This simple procedure frequently relieves and may cure a few *very mild* cases.

Good general treatment, such as baths, attention to food, and also to evacuations, should be insisted upon. Bromides, especially the sodium, should be given when indicated. For the bowels, a drachm of Epsom salt at bedtime, with the advice to go to stool immediately after breakfast. Take a hot cup of coffee or other hot drink on awakening, to promote peristalsis of the bowels.

Generally this class of patients have so little will power that they will not follow a systematic treatment.

Besides, we must treat them locally and morally. General debility and irritability must be allayed by anodynes, tonics, and good nourishment; and unhinged moral views by a change of life from the old ruts which caused them.

Following are a couple of illustrative cases. In a case of normal menopause in a mother of five children and no abortions,—the pa-

tient commenced at forty-six to have a lessened menstrual flow. In six months it had lessened from five to two days; two periods were then missed, and the next lasted but three days; four months later there was a slight show which was the end. During the above changes she was somewhat languid mentally and physically, appetite fair, more nervous than formerly, and symptoms more pronounced at what would be her menstrual periods. After cessation she gained much flesh and had a return of excellent health. Had this case been treated, she would have had few if any of the symptoms enumerated. A second case, showing that premature menopause is sometimes due to chlorosis: Annie E., thirty-six and married, with anæmic hue of countenance, menses at thirteen, regular and without pain till twenty-three, when she married and had one child at twenty-nine. There had been a gradual lessening of the flow for a year previous, with intense debility, epigastric faintness, and drenching perspiration. Was this a case of chlorosis in a married woman, or chlorosis occurring at cessation? Camphor mixture, sulphate of iron internally, and a belladonna plaster to the pit of the stomach cured the patient, but with no return of the menses. I consider that chlorosis in this case was the main factor in bringing on the menopause, as anæmic women are more liable to suffer at this time than at puberty.

Tone up the nutritive and nervous systems, especially the latter, and inquire into any signs or symptoms, however remote. To the rich and indolent, active life, plain food, and less excitement: to the poor, less work, better food, and rest physical and mental. Irritability and reflexes of the internal and external organs of generation should be treated locally and constitutionally. Painting the os and vaginal vault with compound tincture of iodine and counter-irritation will generally relieve reflexes. Galvanic and faradic currents are recommended. The feeling of supposed pregnancy is best combated by examination under ether for the moral effect. Valerian is recommended internally and as an injection in large doses.

Drugs.—Strophanthus, strychnine, digitalis, and nitroglycerin alone or in combination. Cod-liver oil, old *chloride* of iron, hydrobromate of hyoscyamine, papoid, peptogenic pills, various cathartics, especially those producing liquid stools, sedatives, bromide of soda, and other combinations of the bromides.

The following are some of the cases that have come under my care and observation, with treatment:

Mrs. C., aged forty-eight, menstruation at fifteen for five days without pain. Had one child, no abortions. Flow regular till thirty-nine years, when it became very irregular. Had flooding, and passed pieces resembling liver, probably clots. Was obliged to go to bed at every menstrual period, which occurred from two to six months, for about three years. At one time she had two very severe floodings in one month. At forty-one had weakness, fainting feeling, and very painful menstruation, which ended in her forty-second year. After this, when her menstrual period should occur, had peculiar feelings as if menstruation was coming on, with colic and gastritis. Was nervous, excited, crying, and irritable. Flushes still continued. Ordered warm baths three times per week, old tincture of iron as a tonic, in fifteen-drop doses, and the following for the bowels:

℞ Saturated solution sulphate magnesia, ℥iiss;
Aromatic sulphuric acid, ʒiii;
Syr. lemon, ad ℥iv. M.
Sig.—A tablespoonful in a glass of water night and morning.

Also the following for its action on the liver. This prescription, while it is simple and favorably known, has proved in my hands nearly a specific.

℞ Nitromuriatic acid dil., ʒiiss;
Tinct. nucis vom., ʒiiss;
Fluid extract wahoo, f℥ss;
Fluid extract taraxaci, f℥ss;
Oil anisi or gaultheria, gtt. xxv;
Syr. raspberry, ad ℥iv. M.
Sig.—Two teaspoonfuls in a glass of water after each meal and at bedtime.

If the quantity of syrup is increased and the dose also, the medicine will taste better.

If the symptoms are severe, increase the dose; and if the attack is just commencing I have tried the drugs in the last prescription separately and in many combinations, and find this to be the best. For stomach indigestion I give bismuth and glycerin or glycerin and the pepsin preparations, lactopeptine, and the bitter tonics. For irregular and irritable heart, strophanthus, also nitroglycerin, digitalis, strychnine, or the last three combined. Cod-liver oil, especially the pleasant preparations, for a tonic and appetizer. For abdominal pain, external applications of turpentine and oil applied hot on a cloth and covered with oil-silk. For bilious colic, applications of nitric acid and hot water over the liver, and the above prescription

in large and increasing doses. Occasionally calomel, one-tenth grain; ipecac, one-eighth grain; and soda, one grain. The bromides and bromopyrine in large doses and the bromide of potassa, soda, and ammonia separate and in combination for nervousness. I give black haw two-and-half-grain pills three or four times a day for a uterine sedative, and find it excellent. Painting the os with compound tincture of iodine gives prompt relief to reflex stomach symptoms. Hot baths should be given to stimulate the skin and excretory organs and get rid of the waste material from the system.

This case is still under treatment and getting along well.

Mrs. S., aged fifty, menses at twelve years, regular, and lasting three days. Had one child and no abortions. Menses commenced to lessen at forty-three and ended at forty-eight. Six months ago patient noticed hot flashes, commencing in the lower extremities and going to the vertex, but worse in the upper extremities. Just before the menses ceased was very nervous, had frontal headache, loss of sleep, distention of abdomen after eating, steady pain under the arms, bowels constipated, and very bilious. Most of the symptoms commenced just after the menses ceased (a peculiarity of this case). Gave in this case the first two prescriptions given in former case; for the headache oil of mustard in equal parts of ether and chloroform; bismuth and pepsin for indigestion. Called one week later and found patient much better, but had burning and stiffness in each hand; feels as if it would burst. Bismuth and pepsin discontinued. The patient has called twice since, and says she is feeling much better. The other medicines are to be continued. The case is still under treatment and doing well.

Mrs. A., aged 50; has three children, twenty-four, twenty-one, and nineteen years of age. Had two miscarriages since birth of last child. Change of life commenced at forty years of age. At this time she visited four regular physicians, and was thoroughly examined. Three diagnosed pregnancy, and the fourth menopause. The latter said nothing could be done for her.

In the latter part of her fortieth year menstruation ceased for three months. It then returned at intervals of six months, for three years. Hot flushes and excessive nervousness now appeared, and it was at this time that I first became associated with the case, and found the following conditions: Anæmia, excessive flooding, constipation, great trembling and nervousness, gastralgia, gastritis, leucor-

rhœa, palpitation, fear of death, excessive perspiration, asthma, and difficulty of breathing to such an extent that she was obliged to sit up to sleep most of the time at an open window. For leucorrhœa, ordered hot injections of water containing glycerin and iodine, to be taken while on the flat of the back. Gave pills of belladonna, aloes, cascara sagrada, and strychnine for the bowels, the bromides for nervousness, and quinine in ten-grain doses for perspiration. A notable feature of this case was the regularity with which the two worst attacks came on,—namely, February and August. In those months each time I was called for on an average of three or four times per day for over a month. Fear of death and the absence of medical attention, were characteristic at this time, but subsided on my arrival. Suffocating feeling about the heart and attacks of angina pectoris were common. Strophanthus alone and combined with nitroglycerin I found good; also hydrobromate of hyoscine in the medical dose hypodermically, and by the mouth in small doses. At the present time she is enjoying better health than she has for years, but is still under treatment. Since writing this paper the patient has called and reports herself well.

A few years ago a woman of forty years of age called at my office. She was sent from Virginia City, Nevada, with the diagnosis, by two physicians of that place, of heart- and kidney-disease. I gave the case a thorough examination, and also had both a chemical and microscopical examination of the urine made by Professor Abrams. The result of his examination was *nil*. My diagnosis was menopause, and I gave her the treatment indicated. She had immediate relief, with a return of health for one year. I was then telegraphed for, and again put her under treatment, which was carried out for three months, when she became and continued to be a well woman. This was one of the mildest cases that I have ever treated.

This disease is one about which very little is written, and to which little attention is given by the majority of physicians. But as it is a disease which every woman who lives through her three-score years must pass through, I contend that the profession should devote more time and intelligent study to its etiology and treatment.

Ophthalmology.

DETECTION AND REMOVAL OF FOREIGN BODIES IN THE EYE; IRITIS AND IRIDO-CYCLITIS.

CLINICAL LECTURE DELIVERED AT THE NEW YORK POLYCLINIC.

BY THOMAS R. POOLEY, M.D.,

Late Professor of Ophthalmology in the New York Polyclinic; Surgeon-in-Chief to the New Amsterdam Eye and Ear Hospital, New York.

Gentlemen,—There is a superficial abrasion of the cornea in this man's right eye, a little to the inner side of its centre, which looks as though a foreign body had been removed. He is an iron-worker, and I find on inquiry that he has had something removed from his eye.

In regard to the detection of foreign bodies upon the cornea or of a wound left by such a body, I may say that in very many instances it is quite impossible to find any solution of continuity of the cornea by ordinary diffused daylight. Hence, do not send any person away who comes with the suspicion of a foreign body in the eye, until you have examined the eyes by oblique illumination. I have in some cases even had to illuminate the eye by oblique light and at the same time with another glass magnify the cornea. The preferable way in such difficult cases is to use a large hand-glass having a focal distance of seven or eight inches, for this gives you the advantage of binocular vision as well as magnifying. It is obvious in a case of this kind, where there is much circumcorneal injection and dread of light, that the foreign body has been in the cornea; but people often come to you with much intolerance of light and much pain, and the foreign body is situated in the upper cul-de-sac. In such cases you must turn the lid and inspect it with great care. It is easy to see a foreign body on the conjunctiva without oblique illumination. If you irritate the conjunctiva or any mucous membrane,

a catarrhal secretion rapidly forms, and tends to conceal the body from view, and hence, if you see any such little deposit of mucus, wipe it off and look carefully underneath it for the object. Where ordinary search has failed to reveal the foreign body, it is well to introduce a perfectly clean camel's-hair brush or a thin spatula several times into the reflection fold—the part which you cannot expose to view between the upper lid and the globe—and in this way you will often succeed in dislodging it.

Not long ago I was called at night to see the daughter of a physician who insisted that she had a foreign body in her eye. Neither her father nor myself could at first see any, but I thought I detected a point in the reflection fold which seemed to be a little prominent, and on touching it with my finger I felt distinctly the resistance of some sharp foreign body. After much difficulty I succeeded in getting hold of this protrusion, and I pulled out a spicule of glass from one-quarter to one-half inch in length. Inquiry then showed that she had been opening a champagne bottle, and probably this splinter of glass had been thrown out with the cork.

A man came to have me remove a foreign body from his eye, after he had been repeatedly examined by several physicians. In the inner commissure and close to the caruncle was a focus of irritation with much swelling of the conjunctiva, and a careful search after thoroughly cleansing the eyes showed a protrusion, and with cilia forceps I was able to pull out a thin piece of a leaf.

In regard to foreign bodies which are really situated in the cornea, the art of removing them, while apparently a very simple one, requires a good deal of tact and some judgment. You determine the depth of the foreign body in the cornea by focal illumination. If it be superficial, it is just under the epithelium of the cornea or perhaps only adherent thereto. Then the best way of removing it, and that too without wounding the cornea, is to instil a single drop of a four-per-cent. solution of cocaine, and with a cotton-covered applicator wipe the cornea. This is the very nicest manner possible of removing these superficially located foreign bodies. If the foreign body be more deeply situated, some sharp instrument must be used, and a more thorough cocainization of the eye is of course requisite. If the foreign body is in the corneal membrane but not very deep, the best instrument for most cases is what is known as "the spud," or a little knife shaped like a

small chisel. Many of these foreign bodies enter the eye while hot, and, while it is often easy to remove the substance of the foreign body, the whole border of the ulcer is found to be coated with oxide of iron (rust), and the getting rid of this is often much more difficult than the removal of the foreign body itself. Nevertheless, I recommend its thorough removal, not that a neglect to do this will result in any serious trouble, but because if left to nature it will be done by the slow process of suppuration and the person will be deprived of the use of his eye for a considerable time. The removal of superficial foreign bodies from the cornea by the magnet is not successful; for, if it be so superficially placed that the cotton can readily remove it, the magnet is cumbersome and not at all necessary.

Where the foreign body is driven deeply into the cornea, the task of removing it is often very great. Sometimes you will see cases where the foreign body has passed through into the anterior chamber, one portion still remaining in the cornea but not protruding through it. Obviously the attempt to remove it in the ordinary way by picking and prying will force it into the anterior chamber, and hence you should, instead of this, pass in behind it at the sclero-corneal margin with a small lance-shaped knife, and then by placing the knife behind the foreign body, you can push it through the wound of entrance. Usually when it is so dislodged it is readily extruded through the external wound. If you are going to use the magnet to complete its removal, probably the permanent magnet devised by Dr. Gruening will do very nicely. I have no confidence in the use of such a permanent magnet, however, for the removal of particles from the interior of the eye; as some one has wittily remarked, "these magnets are permanently weak."

Let us suppose, in the next place, that the foreign body has passed through the cornea and is in the anterior chamber. I have in a number of instances succeeded in the removal of such foreign bodies without any material damage to the eye. If it be a particle of steel or iron, you can often remove it with a magnet, unless it be encysted in some of the tunics of the eye. Such bodies often lie in the bottom of the anterior chamber without provoking any irritation, yet you must not think that there is not imminent danger of serious trouble.

Now, let me tell you what you must *not* do. Do not put any atropine in the eye, for if you do this you are more apt to wound the lens in the operation, and the foreign body itself may pass

through into the posterior chamber or it may come in contact with the lens and wound its capsule. There is some contraction of the pupil incident to the irritation caused by the foreign body, but it is well in addition to this to put a little eserine into the eye. Do not use an iridectomy knife, for its point entering the anterior chamber is likely to push the foreign body before it if that body be free in the anterior chamber. Instead of this, a narrow Graefe's knife should be used to make a wound in the sclero-corneal margin below, being careful not to make too small an incision. You will often find that, having made the incision in this way, the patient's head not being thrown too far backward, the foreign body will come into the wound of itself; but if not, it can be readily withdrawn with a pair of forceps. If this is not practicable, the point of an electromagnet will usually remove it without further difficulty. Not infrequently the foreign body passes through into the anterior chamber and is found sticking into the iris, without the lens being wounded. Such a body can be removed by making a section in the same way that you were recommended to do when the body was lying loose in the chamber. Recently Dr. Knapp showed a case in which he had removed such a body without mutilating the iris. The body was disengaged from the iris and extruded from the anterior chamber, and a perfectly circular pupil was left. This was an unusually successful case, but in most instances I would not attempt to do such a thing. I think it is far better to make an abscission of the part of the iris in which the foreign body is lodged, in the manner I have already described, and, if the part of the iris containing the foreign body corresponds to the middle of your incision, it will prolapse into the wound, either of itself or by gentle pressure. In most of these cases you will find that the iris and the foreign body are intimately connected, and that it will be necessary to cut off a portion of the iris with the foreign body. If you return such a mangled iris, you are fortunate if suppuration does not ensue. That suppuration does not always occur when such particles of iron are introduced, our bacteriological friends tell us is due to the fact that the iron has entered the eye in a heated condition, and so the bacteria have been destroyed. In not a few of these cases of foreign body in the iris, you will find that suppuration of the iris has already begun when the case first comes to you.

Some years ago I saw a man whose eye had been injured by the

bursting of a gun. The cornea was filled with grains of gunpowder, and one or two of these grains had passed through the cornea into the iris. A grain of gunpowder is less likely than almost anything else in the way of foreign matter to cause irritation, and on this account I often leave it alone. However, in this case a point of suppuration soon appeared near the foreign body, causing much swelling of the iris, a great deal of pain, and hypopyon, and the iris was adherent to the lens. Hence, the iris did not prolapse into the wound I made, but with a pair of forceps I grasped the offending portion of the iris and cut it off, and the man recovered rapidly.

Atropine is indiscriminately prescribed after the removal of foreign bodies, as it often is without any particular object in view. You should remember, when prescribing atropine, that you incapacitate your patient for work. It is not always necessary to use it after removing a foreign body. The amount of subsequent irritation depends a good deal upon your skill in the removal. Tell the patient to bathe his eye with very cold water, for this will allay the irritation and pain, and this is all that is necessary, for the wound will heal quickly of itself. If there be only a superficial ulcer of the cornea, apply a little cotton over the eye with a loose bandage for a few hours. You will be tempted sometimes to order cocaine for the patient, but, although this drug will allay the irritation for about fifteen minutes, the pain will return with renewed vigor, and you will find that your patients will complain bitterly of the frequent repetitions of the drug which are necessary, and, more than this, if it be frequently repeated for a long time, it interferes with the nutrition of the cornea. If there be deep-seated corneal irritation or if there be iritis, of course you must use atropine; but ordinarily, if the body have been superficially placed, cold water bathing will be sufficient.

Now, on examining our patient here, we find that the foreign body has been deeply seated, for there is much infiltration around the abrasion. If the patient can stop work for a short time, he should have a weak solution—preferably of homatropine—and he should bathe his eye with hot water. Where there is already an ulcer with some diffuse infiltration around it, hot water should be substituted for the cold bathing.

IRITIS AND IRIDO-CYCLITIS.

In this patient[1] it would seem as though the eye was making slow progress towards recovery. You observe, however, that the lachrymation and photophobia are less, and the upper part of the eyeball has less of the characteristic circumcorneal injection. The case has assumed a better aspect, and there is a more decided iritic form to the disease. Dr. Webster saw the patient in consultation and found no immediate necessity for the removal of the eye. You must now consider whether the feature I consider most dangerous, the pain on pressure over the ciliary region, still persists. It is wise, when you are endeavoring to find out whether the other eye has become affected sympathetically, to make palpation of that eye first. I told you it was a curious circumstance that when the eye became sympathetically affected in irido-cyclitis there was often a point in the good eye corresponding to the injured one which became painful. An interesting fact which has not been mentioned is that in some severe cases of that kind the eyebrows have turned gray at a point corresponding to the most painful spot in the ciliary regions, and in the corresponding point on the opposite brow there have also been gray hairs. This is particularly interesting in connection with the pathogenesis of these cases. It speaks very strongly for the reflex by the ciliary nerves. On investigating this point in our patient, there seems to be no pain. I do not ask the patient if it hurts him, but I prefer to have him close the eyes, and then you can very readily tell by his facial expression if the pressure causes him pain. Please notice that the pain has entirely disappeared, although on both previous examinations we have found exquisite pain, which was evident enough by his expression. We have now decided for the present not to make an enucleation, but I do not say that it may not yet be necessary. It is interesting to note that there is a modification in the course of affections of the iris produced by racial influences, and it is a fact observed by myself and others, and particularly by Dr. C. S. Bull, of New York, that very many diseases run a far more severe course in the African race than in others. This is especially true of iritis, and pre-eminently so of iritis due to syphilitic infec-

[1] This case was first presented as one of traumatic irido-cyclitis (on account of its coming on after an injury), but turned out to be syphilitic iritis with cyclitis as well.

tion; so that in a severe case of that disease occurring in these people I always make a guarded prognosis. The explanation of this may be found in the fact that they live under poor hygienic surroundings. I may mention here that colored persons are singularly free from one of the most common forms of eye disease, trachoma, so that Dr. Swan Burnett, of Washington, has written a pamphlet in which he describes its exceeding rarity in negroes. My experience is not entirely in accord with his, but the occurrence of trachoma is certainly of infrequent occurrence in the African race. The patient's vision is 20/70 with the bad eye and 20/100 with the good one. Notice, please, the submaxillary glandular enlargement in this case. I think there is a great deal of hereditary tubercular disease in the colored race which accounts for their behavior under various diseased conditions. Ordinarily this glandular enlargement would not be a feature of such a case, but the colored people are predisposed to such enlargement. There are cases reported in which sympathetic inflammation occurred in the second eye from irido-cyclitis due to injury, and in which the primarily injured one has been saved, while the other one has been entirely destroyed. Among the most remarkable of such cases is one reported by me in the very early numbers of Knapp's "Archives." An intelligent man came to me from the West, and stated that he had had inflammation of the injured eye and the other became affected sympathetically. It was entirely destroyed, but the injured eye had vision of 20/70. I put it down as a postulate that after sympathetic ophthalmia is fairly declared in one eye it is useless to make an enucleation. Just think of the difference between such vision and total darkness! His good fortune is to be attributed to his being in a wilderness where no one could take out his eye for him. The eye which had become sympathetically affected was, when I saw him, the irritated one, and I advised its removal, but he declined. This is almost a unique case. Mauthner, of Vienna, in his work, which is the fountain-head of information on sympathetic ophthalmia, refers to such cases, but omits any detailed account of them.

On examination, our patient shows that there is a good dilatation of his pupil, the iris looks clear and is free from exudation, and there is a distinct synechia downward. It is distinctly stated, in the note-book of the hospital, that there was considerable venous hyperæmia of the optic nerve and retina; but this has entirely disappeared,

and the whole aspect of the case is changing for the better. The fundus is almost normal.

This next patient, J. H., thirty-five years of age, began to have trouble with his eye ten days ago, the first symptom being severe pain across the forehead. He says that three months ago he had a chancre, and a little over three weeks ago he developed an eruption. Here is the beginning of an iritis in the very early stage of a secondary disease, and this is the rule. The exceptions are not infrequent, but in my own experience it is the early phase of development of syphilis that is characterized by iritis. There is a mistiness before this man's eye, with severe supraorbital pain. When I first saw him it was rather difficult to be sure of the presence of iritis, on account of the great conjunctival swelling, but the attention was most attracted by the intolerance of light and by pain. Closer examination showed that, although synechiæ were not present, there was a lack of lustre to the iris. Ordinarily you know how brilliant it is, and how plainly you can see the fibrillæ by the aid of oblique light. This lack of lustre is one of the earliest characteristics of iritis, which of course later on is accompanied by change of color. There was also contraction of the pupil, and it refused to respond readily to repeated instillations of atropine. In the large majority of instances syphilitic iritis comes on in this insidious manner; in fact, this is the usual mode of development of all the lesions of syphilis. We wish to know whether there are synechiæ present, and we certainly should know whether there be any complications in the way of internal eye disease. Affections of the fundus complicating iritis are far more common than generally suspected. A German observer some years ago examined the eyes of all patients coming with this form of iritis, and found complications of the retina, optic nerve, and choroid to be extremely common. I compiled some years ago statistics of fifty cases of iritis, and found such complications, but not so frequently.

Where there are already turbidity and exudation, it is easy to make a mistake about the condition of the fundus, for the image projected through the cloudy media might lead you to refer the condition to the retina or some of the internal structures of the eye. In the left eye there is no synechia and the iris has regained its lustre. In the right eye there is more injection in some directions than in others, and this is considered by some observers to be characteristic of syphilitic iritis, but I doubt it. In the right eye there is no dis-

ease anteriorly, no synechia, and but moderate circumcorneal injection; and there can be no doubt about his complete recovery.

This case comes to us when there is really only hyperæmia of the iris, and his improvement since I first saw him has been very remarkable. I have shown several times here a woman with severe iritis of the same kind, and you may remember how wonderfully the case improved while receiving energetic specific treatment. She entirely recovered, but she had a very bad relapse, which was far more severe than the first attack. She was admitted to the hospital, and mercurial treatment was energetically carried out by inunctions with mercurial ointment containing a little lanolin twice daily, and in a week or ten days she was well. This form of iritis tends to become *iritis plastica* with broad adhesions. We desire to absorb the inflammatory exudation and at the same time keep the pupil dilated. In specific iritis, then, we should use a strong solution of atropine, which should be instilled into the eye at frequent intervals until the pupil is widely dilated and any synechia present is broken. Then use the atropine less frequently in order to maintain the dilatation. If you put atropine into the eye every hour or two, you must remember the possibility of inducing the physiological effect of the drug by the passage of the solution through the tear-passages into the throat. To avoid this danger, after each instillation pressure should be made at the inner angle over the tear-sac for a few minutes until the drop is absorbed. With this precaution you can use atropine as frequently as you desire. Some practitioners make instillations every fifteen minutes for one or two hours, but I have not found the method specially beneficial, and I think by instillations at intervals of one or two hours the same effect will be obtained.

In using atropine, you will be greatly aided, in case the dilatation is difficult, by attention to the following facts. The non-dilatation of the iris is due not alone to the presence of the synechia, but also to the fact that it is gorged with blood. In many instances where it is impossible to dilate a contracted pupil, if you will apply six leeches to the temple and afterwards keep the bites bleeding for a half-hour or more by hot fomentations so as to deplete the vessels supplying the iris, you will find that the mydriatic will then act. Another good plan is to use alternately cocaine and atropine. You all know that the former drug produces a blanching effect upon the tissues, acting somewhat like a hæmostatic, and after its use in this way you

will find that the atropine will bring about dilatation, when it would not do so if used alone. This dilatation must be maintained so long as there is any circumcorneal injection. It is especially essential in syphilitic iritis, on account of the insidious way in which plastic exudation comes on. It is remarkable that physicians in general practice seem very uncertain about this point; it is a safe rule to wait until the eyeball becomes white. This man is taking pills of mercury internally.

We must give the remedy which will act upon the constitutional disease that caused this local trouble, and which will help in the absorption of any inflammatory exudate likely to compromise the eye by gluing the iris to the lens. The remedy above all others is mercury. In using it in syphilis the manner in which it is administered depends upon the form of the disease. In a case like this there is no necessity for employing the mercurial treatment energetically. He should be given mercury in mild doses, so as to keep a little in advance of any new developments of his syphilis, and he should be kept under it until well. When there is a new development, its administration should be resumed. Personally I do not believe in the positive cure of this form of the disease. If you have a case like that of the woman already mentioned, where the disease is more acute and the damage is already very great, the mercury should be used as energetically as possible, in order to secure its characteristic effects with great rapidity. In cases where there is a gummy tumor in the iris—which is, by the way, the only perfect expression of a case being a syphilitic one—or if there be a broad synechia or exudation in the pupil, the mercury should be employed more energetically, and you should therefore use inunctions of mercurial ointment, changing the position of the inunctions so as not to cause any affection of the skin. The improvement will be almost surprising. The changes in the iris tissue, if not checked, will impair the sight, by subjecting the eye to recurrence of inflammation from adherence of the iris to the capsule of the lens. I am sure that a number of eyes every year are left in a condition which ultimately results in their loss, by the careless way in which these inflammations of the iris are treated; and it is not entirely our fault; for many of these patients cannot give the proper time and attention to the treatment of their syphilis. They should be rigorously treated as in-door patients until they are perfectly well of the disease. When they can be so treated,

they are kept in bed in a darkened room during the whole treatment of the iritis, and are not allowed to emerge from this confinement until they are virtually well. In this way I very rarely have a relapse. If the patient be allowed to come to you every day or two, as soon as the pain is better he will become careless, and return only at long intervals, and then with fresh synechia.

FLICKERING BEFORE THE EYES.[1]

LECTURE DELIVERED IN THE HOLIDAY COURSES FOR MEDICAL MEN, IN BERLIN.

BY PROFESSOR SILEX,

Formerly Assistant in the Royal Ophthalmological Clinic in Berlin.

Gentlemen,—I will comply with your wish as regards a discussion of the phenomenon called "flickering before the eyes," but will remark at the outset that it is complained of by sufferers from all imaginable maladies, and that the complaints are of a very vague nature. It is always merely a symptom of some other disorder, and never a disease by itself. The patient, indeed, is not aware of this; he thinks that his other organs are healthy, and wishes only to be rid of the troublesome flickering.

Now, what do we understand by flickering? On the whole, we shall probably fairly describe the condition if we say that it is the perception of a quickly vibrating light or motion not easy to explain to one who has not experienced it himself. This perception takes place both when the eye is open and when it is closed, no matter whether it is in motion or at rest.

The sensation always takes place in the cerebrum. Its localization by the patient varies. Sometimes he thinks the flickering is before the eye, sometimes in the eye, and sometimes also in the brain. In the latter case the irritation may emanate from the visual pathways, and the projection outward may not take place; or it may arise in parts connected with the centre of perception. The flickering is then often accompanied by flashes of light. That this is the case we may conclude from the statements of persons who have become blind

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[1] On the occasion of the last holiday courses for medical men, I was requested by one of my hearers, at one of the meetings at which themes chosen at pleasure were theoretically discussed, to deliver a lecture on flickering before the eyes. The theme was not exactly one that I should have hit upon myself, for I did not remember having read any publication of which it was the main subject. I quickly put together what I had to say and delivered the lecture here given.

in both eyes or undergone enucleation, and who complain piteously of terrible "internal flickering and tormenting flashes of light." It is singular that the flickering of the one eye, in detachment of the retina for instance, may communicate itself to the other.

The duration of the phenomenon varies. Sometimes it lasts for seconds, sometimes for minutes or hours, with free intervals of various length; but sometimes it is permanent and lasts for months or years. In some cases only the region of the point of fixation is affected, and in others a much wider field.

In order to inform ourselves as to the causes of flickering, it is advisable to distinguish between cases in which organic alterations exist and those in which there are none, and in which it is therefore a symptom of functional disorder.

The organic alterations may be in the bulbus itself, in the optic nerve, or in the brain. As regards the first, hyperæmia, anæmia, choroiditis, or retinitis may be the cause. Hyperæmia combined with the effort of accommodation causes flickering in the hypermetrophic, and often renders the myopic unable to work for weeks. After some minutes they have such a dancing and flickering before their eyes that they must lay aside their books. The ophthalmoscope shows general hyperæmia of the papilla, which easily comes from the choroid through Zinn's corona vascularis and small vessels that enter the optic disk from the border of the choroid. It may also happen that some irritation directly strikes the retina, as, for instance, after exposure to intense light. In these days of electricity this is often observed. The remedies are suitable spectacles, aperients, and bleeding at the temple, which latter remedy is much too seldom applied nowadays.

Other troubles that are wont to accompany flickering are opacities of the vitreous, due to the most various causes, choroiditis, and retinitis. In some forms, however, the symptom comes more into the foreground than in others. Some opacities of the vitreous are seen as figures flying before the eye, agreeing with them in form, but irksome to the patient. If the ophthalmoscope yields a negative result, they are the so-called muscæ volitantes. If these or ophthalmoscopically perceptible opacities are very numerous, the patient generally consults a doctor. The flickering is probably due to the numerous changing shadows on the retina caused by the corpuscles.

I do not intend to discuss all the diseases of the retina and the

choroid in which flickering is complained of. One of them, however, I think I must mention,—viz., choroiditis diffusa serosa (Foerster), —first because it is not very rare, and secondly because in about ninety-five per cent. of the cases the patients are syphilitic. The investigator is struck by the so-called dust-like opacities of the vitreous, which, combined with finer alterations of the choroid, occasion complaints of bad sight and flickering lights near the point of fixation. The latter are roundish, bright in the middle, dark at the edge, and appear especially when the patient comes from the dark into the light. The flickering lasts for weeks or months, and can be cured only by energetic inunction.

The flickering that accompanies detachment of the retina is uncommonly troublesome. It and the light-apparitions that frequently accompany it are maintained by the atrophy of the detached retina and by the tearing and fluctuating movements of the membrane. Some patients suffer from this flickering for decades. There is no remedy for it, and if the mental condition suffers under it, resection or the enucleation of the eyeball may be necessary. Strange to say, in some cases the flickering continues even after the removal of the eyeball.

It deserves special notice that in retinitis albuminurica, in which the alterations are generally very great, whether the disease is chronic or acute nephritis,—the nephritis of pregnancy, for instance, flickering is very often not complained of at all.

I will now say a few words about that flickering which results from alterations of the optic nerves. Here we have to consider the most various forms of inflammation, and the degenerative processes without inflammation, of which tabes dorsalis is the chief. The processes that go on in the nerve in the course of these diseases cause flickering and generally light-sensations also. That mechanical injuries cause very bright flashes of light we know from the cases in which resection of the nervus opticus was performed only under cocaine: at the moment when the nerve was cut through, the patients saw a bright flash. Flickering and incessant light before the eyes often torment even stone-blind tabetics for years. Hardly anything can be done to remedy this. Bromide of potassium, cocaine as a means of reducing reflex irritability, and electricity are, strictly speaking, of no avail.

Flickering may also have a central origin. The flickering that

precedes uræmic attacks, and that which sometimes accompanies the amaurosis which sets in after eclampsia when the sensorium begins to act, are instances of this. People who wish to describe fainting-fits which they have had often say, "It grew dark and there was a flickering before my eyes." Now, where the cause in these cases is the separation of the component parts of the blood or a vascular spasm and the consequent defective blood-supply, the irritation never strikes the peripheral parts of the visual apparatus, but begins in the brain, and probably in the visual sphere of the occipital lobe. I must also mention here that irritations which strike other cerebral nerves are communicated along the association-fibres to the visual sphere, and may cause flickering and flashes of light and color-sensations there. It is well known that some people have color-sensations when they hear sounds. One of my patients, who indeed was "nervous," always had flickering when she heard loud and unpleasant noises.

Besides these groups of diseases there are others in which no anatomical alterations are observable, and which are called functional disorders. To these belong the most various forms of neurasthenia, which are accompanied by flickering. For brevity's sake, I select anæsthesia retinæ, or amblyopia of the field of vision, a disease which often causes a central diminution of the keenness of sight, and especially a concentric narrowing of the field of vision, for weeks and months. "I can't do my exercises for school," children complain; "all the letters are jumbled together, and it flickers." And yet there is no conjunctivitis and often no hypermetropia. Hysterical patients, whose hysteria reveals itself in some eye-disease along with other symptoms, constantly lay stress on the irksome flickering which they suffer from. They suffer especially from hyperæsthesia retinæ (Foerster). They complain of painful sensations in the region of the trigeminus—burning, pressure, pain during work—and of disagreeable feelings in the neighborhood of the opticus—dazzling, flickering, and inability to bear contrasts. The loquacitas hysterica soon enables us to give a sure diagnosis.

I must not neglect to mention the disturbance of the sight by dark spots on the field of vision (Flimmerscotom), which was best described here in Berlin by the late Professor Du Bois-Reymond,—naturally enough, for he suffered much from it himself. Beside the point of fixation appears a defect in the field of vision, which spreads,

with a vibrating movement of its edges, over the whole field. The power of sight is reduced to a minimum, and both eyes are always affected, though non-medical patients tell you that only one is. After about twenty minutes the flickering ceases, and after other twenty minutes the attack is ended. It is frequently followed by headache and vomiting. I cannot go more minutely into the clinical details at present; you will find sufficient information in every text-book.

Gentlemen, this is all I have to say at present about flickering before the eyes, and I hope I have said enough to enable you, with the aid of some reflection, to deal with such cases when they occur in your practice.

INTERSTITIAL KERATITIS.

CLINICAL LECTURE DELIVERED AT THE GROSS MEDICAL COLLEGE.

BY ROBERT F. LeMOND, A.M., M.D.,

Professor of Diseases of the Eye and Ear in the Gross Medical College, Denver, Colorado.

GENTLEMEN,—The case which we have before us this morning is one of considerable interest, as the disease involves the eye to such an extent that unless it gets the proper care and treatment it would destroy the utility of this organ.

This is a case of interstitial keratitis, also called parenchymatous keratitis. You will notice, by examining this eye carefully, that it has a misty, hazy appearance, resembling somewhat a glass after you have blown your breath on it. The opacity prevents the rays of light penetrating the eye.

I think that we have hypopyon keratitis, which resembles the interstitial form very much, and yet they emanate from different causes. These cases are often very hard to differentiate, and you will have to be governed to some extent by the history which you get. For instance, in nearly every case of interstitial keratitis we learn that the eyes gave trouble in early childhood because of inherited syphilis, and it frequently develops before the age of ten years.

Besides, we will often find the typical Hutchinson teeth, which will help us out in making a positive diagnosis. Of course, in these intricate cases it takes all of these little signs grouped together to come to anything like a positive conclusion, and try to be as much like David Crockett as possible in using his adage, "Be sure you are right, and then go ahead."

We do not usually find a very marked amount of ocular congestion in this trouble. Sometimes in the beginning there is a superabundance of lachrymation, but that usually passes away in a few days, and nothing then remains except a little circular congestion at the sclero-corneal junction and the haziness in the cornea.

We often observe this trouble in both eyes at the same time, yet one eye is always attacked first, and finally the other succumbs unless the disease is intercepted by treatment before it reaches the other eye.

In hypopyon keratitis we often see the clouded spot in one eye only, usually in patients with poor health, where the system is supplied by impoverished blood and the lymphatics are engorged, as in nearly all these cases we find the coated tongue, engorgement of the liver, and constipation of the bowels.

In interstitial keratitis photophobia seldom occurs, as in the vast majority of cases there is no involvement of the ciliary body and not much engorgement of the retina; but, where the ciliary body does become involved, of course retinal engorgement will also be present and there will be photophobia, regardless of the amount of opacity in the cornea. In some cases we shall have quite an iritis and posterior synechia, and once in a great while we shall find a broken-down condition of the cornea, resulting in an ulcerative keratitis, which is always a very ugly and troublesome complication.

Sex does not seem to play a very large part in this disease of the eye, as we usually find both sexes well represented.

Another complication that might give you some little trouble in making the proper diagnosis is met with where a foreign body had come in contact with the cornea and produced an inflammatory condition, and after that passed away we should find, by examining carefully, that a little cloudiness had remained, but the prognosis of the case would not differ to any great extent, because the treatment (especially locally) would be the same.

Treatment.—I usually prescribe in these cases a preparation of mercury; the following prescription is rather a favorite of mine:

℞ Hydrargyri oxidi flavi, gr. ii;
Vaselin. alb., ℥ss. M.
Sig.—As directed.

I cocainize the eye with a four-per-cent. solution before applying this ointment, as it is more or less an irritant. I apply about ten grains of ointment between the lids, and continue using this at least once a day for weeks, and even months sometimes, before the trouble has disappeared. I vary the strength of the prescription according to the gravity of the case. In connection with this I prescribe the following, to be given internally in increasing doses:

℞ Kali iodidi sat. sol., ℥ii.

Sig.—Ten drops three times a day in water, increasing the dose each day until toleration is reached.

In some cases this will become an irritant to the stomach, and we may have to omit it for a few days at a time, and go back to smaller doses. In hypopyon keratitis I would use the same oxide ointment for the local treatment, and internally I would give something like the following:

℞ Elixir ferri, quinin., et strychnin , ℥iii.

Sig.—One drachm three times daily.

This will build up the system. Always be careful not to tell your patients that they will probably never be again attacked with this kind of an eye trouble, because it is so apt to return. But in the majority of cases the foregoing treatment will prove very satisfactory.

You can safely say to your patient, however, that the eye, so far as acute vision is concerned, is more or less permanently injured; while it may not show to the casual observer, there will be sufficient cloudiness in the cornea to be seen with a strong glass or with the ophthalmoscope; and, of course, the very least amount of coloring matter possible will obstruct the free passage of rays of light through the cornea.

Where ciliary complication occurs and you see that the iris is becoming involved, it will be necessary for atropine to be used, as a thoroughly engorged iris and a contracted pupil will very soon become serious if not attended to properly. I usually prescribe the following:

℞ Atropini sulph., gr. ii;
Aquæ dest., ad ℥i.

Sig.—Two drops in the eye every three hours until the pupil is well dilated, then two drops three times a day.

I use this until all symptoms of iritis have disappeared. I would not hesitate to use it several times as strong if necessary to accomplish the desired result.

Laryngology.

AUTOSCOPY OF THE LARYNX AND TRACHEA, AND ITS RELATIONS TO ŒSOPHAGOSCOPY.[1]

CLINICAL LECTURE DELIVERED IN THE LARYNGOLOGICAL DEPARTMENT OF THE POLYCLINIC OF THE UNIVERSITY OF BERLIN.

BY ALFRED KIRSTEIN, M.D.,

Laryngologist to the Polyclinic of the University of Berlin, Germany.

Gentlemen,—It has always been considered that since, to the eye of an observer, the path through which rays of light must travel from the larynx and the vocal cords was naturally an angular one, some optical means for bending those rays must be inserted in their course in order to make these parts visible to one who wishes to investigate their condition. The invention of such optical instruments was practically the foundation of modern laryngology. It does not seem to have occurred to any one that there was another alternative for removing the obstacles that hinder vision under these circumstances,—namely, that the path along which the rays of light have to travel might be made a straight one. I suppose it was considered impossible to overcome the hinderance put in the way of such a method by the prominence formed by the thick muscles that go to make up the base of the tongue. It is, however, in many cases a comparatively simple manipulation to press the interposed lingual prominence downward and forward out of the way. It was a matter of no little surprise to me, some two years ago, when I first tried it, to find how easy it was to accomplish this in many cases; for I realized that I was doing something that had been considered, under conditions that were at all normal, practically impossible.

Of course, after the tongue is gotten out of the way, there still remains the epiglottis; but to dispose of this after the tongue is

[1] Reported by J. J. Walsh, M.D., Ph.D.

under control is a very simple matter. All that is required to overcome both hinderances to direct vision of the larynx and vocal cords is a tongue depressor used in the right way. Up to this time tongue depressors had been used only to enable us to get an unobstructed view of the pharynx and its appendages. For this we simply pressed the tongue down, and were careful not to insert the tongue depressor too far into the mouth, in order to avoid producing pharyngeal and lingual basic reflexes.

Under these circumstances, the tongue at its base rolled itself out from under the tongue depressor in a prominent ridge, that more than ever precluded the possibility of seeing the larynx. If the tongue is, however, not alone depressed but pulled forward, then the field of vision is a much better one, and extends downward from the pharynx, according to the position in which the head is held at the moment of examination. To pull the tongue forward, however, it is necessary to put the tongue depressor well back on the tongue, just in front of the epiglottis. It was this manipulation that the traditional prejudices of laryngologists kept them from doing, and so prevented any direct inspection of the larynx.

Despite traditional prejudice in the matter, it is possible to put a tongue depressor back on the very base of the tongue, where the ligamentum epiglottidis is inserted into it. It does not produce the inevitable reflexes that have been supposed if done quietly, boldly, and firmly. And once it is accomplished, the problem of direct inspection of the larynx, what I have called autoscopy, is solved for many cases. It had been said, all the text-books had it, that the tongue depressor must not be inserted beyond the circumvallate papillæ, or it would produce uncontrollable pharyngeal contractions, and even vomiting, if persisted in. I found the rear of the tongue no more sensitive, practically, than the rest of the organ, if it was touched boldly and with no uncertain movement. The secret lies in practice, but so does it also for ordinary laryngoscopy. There are a certain number of supersensitive individuals who cannot stand this manipulation, even though the anatomical arrangement of the base of their tongue and its relations to the larynx make them otherwise suitable subjects for autoscopy. In such cases this may be overcome partly by training them to stand the manipulations and partly by the use of cocaine, as is sometimes necessary in ordinary laryngoscopy.

Just in front of the epiglottis is a groove, the fossa glosso-epiglot-

tica; just under this comes the hyoid bone. Between the mucous membrane and the bone here there is only a thin layer of connective tissue, but no muscle, as you can demonstrate for yourselves by pressing your finger upon this region in your own mouths. It is from this point forward that we must have control of the tongue in order to make the line of vision to the larynx a straight one; for it is just in front of this groove that the tongue humps itself ordinarily, and prevents direct vision. If we could control the tongue from here, there would only remain the epiglottis in the way. Both obstacles may be overcome by a simple manipulation. If we place the end of a tongue depressor on the glosso-epiglottic ligament, while pressure slightly downward but mostly forward is made, the epiglottis lays itself along the blade of the depressor. In most cases a furrow in the tongue is made through which vision is unhindered.

Not all patients are capable of being submitted to this procedure with equal success. There are some in whom it is but partially successful, and we cannot get the tongue far enough forward to enable us to see more than the back part of the larynx and the posterior end of the vocal cords. There are others in whom only the apex of the arytenoid cartilage can be made visible, and finally there are those in whom no part of the larynx can be brought into view. The reason for this failure of direct vision is not in most cases, as might be imagined, supersensitiveness, so that the manipulations cannot be borne, nor anomalous contour of the laryngo-pharyngeal opening, but the size and arrangement of the muscles of the tongue.

The difficulty encountered in these cases is irremediable, and such patients are simply unsuitable for autoscopy. There is no external appearance, and no appearance of the tongue itself, or its relation to surrounding structures, that I have been able to observe, that will enable us to decide in a given case whether a patient is "autoscopable" or not. We can only decide this question after trial in the particular case and under favorable circumstances.

The manner of getting the epiglottis out of the field of vision had been described previously by Reichert (then of Rostock but now of Berlin), who considered that the pressure upon, and consequent tenseness of, the ligamentum glosso-epiglotticum, simply pulled the epiglottis mechanically into the position it takes up, lying on its superior surface along the blade of the tongue depressor. I have always been of the opinion myself that it was rather the depression

of the hyoid bone by the pressure upon it here, where the bone is so close to the mucous surface, that acted upon the epiglottis, principally by means of the ligamentary attachments between the two.

In order to demonstrate to you that the line from the oral opening to the larynx may be easily made a straight line, permit me to show you this frozen median section of a child. You see that this piece of wood inserted into the larynx through the mouth does not exert excessive compression upon surrounding tissues, and yet retains its place. The head is not forced into an abnormal position, but occupies one midway between forced extension and forced flexion. In fact, in this median position of the head, in adults as well as in children, the line from the opening of the mouth into the trachea is a straight one.

If I stand in the enforced military position with head held rigidly at a right angle to the trunk, then the continuation of the upper air-passages would end at a point about the root of my nose. If, on the other hand, I stand with my head high in the air, face upward, the continuation of the line of the trachea would end at the chin. Both of these are extreme positions, and the position most favorable for autoscopy is between them.

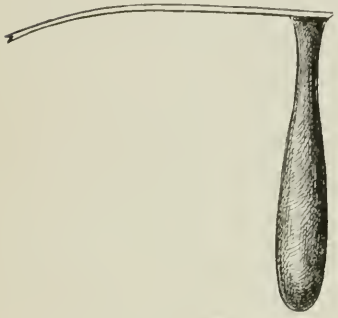
The practical technique that I have found best suited for the use of the autoscope is about as follows: While the patient sits, the doctor stands. Having placed the forefinger of his left hand on the patient's forehead, he raises the upper lip slightly with the thumb of this hand. This enables him, also, to get the moustache of male patients out of the line of vision. With his left hand he then brings the patient's head into a position of median elevation, and inserts the tongue depressor. The instrument should be carried well back, just in front of the epiglottis. Then the tongue is not forcibly depressed, which would cause pain, and is not pulled forward by the instrument, which would prove unbearable, but by the exercise of some leverage on the handle the tongue is held firmly in such a position that the muscular substance of it occupies two folds that lie along the depressor, but leave a groove just over the instrument in which direct vision is unhindered.

I take for the demonstration a patient on whom this method of examination by autoscopy has never been tried. I assure the patient that though I shall introduce the tongue depressor farther than usual, it will not cause the slightest inconvenience, provided she continues

to breathe quietly. I now insert the instrument, being careful not to touch the tongue as I go in, until I am ready to definitely bring the depressor down on it (which is, of course, the rule in the use of the tongue depressor under all circumstances), and taking special precautions not to go too far and touch the epiglottis, which is extremely sensitive and will at once give rise to reflex lingual and pharyngeal movements.

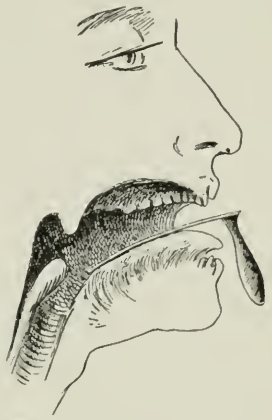
I use this special make of tongue depressor (see illustration) be-

Fig. 1.



Tongue depressor.

Fig. 2.



Method of autoscopy of larynx.

cause I have found by experience that this form of instrument is best adapted for the purposes required. The blade of the instrument is long, so as to go along the whole tongue, and it is fastened at right angles to a good-sized easily graspable handle. When the end of the hand is tilted only slightly outward, the leverage exerted here on the end of the blade, as you can see, is considerable. At the end of the blade, which is rounded so as to be less irritating, there is a groove in which the glosso-epiglottic ligament is supposed to find a place. This groove at the end adapted to the parts, and the leverage exerted by the handle at right angles to the depressor proper, enables you to hold the tongue firmly in the position required, if you are to have an unobstructed view during an interval of time sufficiently long to enable you to make up your mind as to the exact condition that may be present in the larynx.

I now proceed to examine our patient. Those of you who are standing just behind me get a glimpse at once of the posterior part

of the larynx. I was able to see myself nearly the whole of the vocal cords, and this without previous exercise on the part of the patient. We evidently have to do here with a good autoscopable individual. So far as seen, there was nothing abnormal except a slight hyperæmia of the larynx (the patient comes complaining of sore throat, and thinks that she has caught a cold).

Here is a patient who is much more used to the manipulations, and you see how easy it is to see her vocal cords in their entirety. From this patient we removed, some weeks ago, a fibroma of the left vocal cord with the autoscope alone. Here are other patients, a young man and a young woman, into whose larynxes you get an excellent view.

It seems so simple now to use this method of examination, that one is apt to forget that up to two years ago it had never been tried. It is true that Tobold tells the story of a woman who came to consult him about her throat, and when he was about to use the mirror told him not to, as it was unnecessary. She then proceeded to so depress her tongue and elevate her larynx that he was able to see her vocal cords perfectly. This was the first direct view of the larynx obtained, the first autoscopic examination, and it is more than a little surprising that it did not prove the occasion of further experiments that would show that under favorable conditions a laryngoscopic mirror could be dispensed with.

Tobold tried to have others of his patients in whom the anatomical conditions seemed favorable, do the same thing, but did not succeed, and concluded that the power to do it was dependent on very exceptional anomalous functions of the tongue and external laryngeal muscles. I have tried myself to have patients, who had proved very well adapted for autoscopy, accomplish this manœuvre of exposing their vocal cords voluntarily, but have never succeeded in having any of them do it except extremely unsatisfactorily.

As to the position that autoscopy will occupy in laryngology in the future, I think that that is now perfectly clear. It will by no means replace the mirror, because there are a large number of people the anatomical configuration of whose tongue makes it impossible to see their laryngeal structures satisfactorily, especially the anterior ends of the vocal cords, by this method. No amount of practice on the part of examiner or patient will remedy this; it lies in the nature of things.

On the other hand, in practically all patients a better view of the posterior end of the vocal cords and of the apices of the arytenoid cartilages may be obtained by this direct method than with the laryngoscopic mirror. As tuberculous lesions and the laryngeal lesions of typhoid fever, in fact of all the exhausting diseases, occur here, and as it is at the back that decubitus makes itself manifest when the patient, in an intensely relaxed muscular condition, has been lying down for a good while, the importance of this fact can be readily calculated. The view obtained by this direct method is not only more complete, but it is also more satisfactory, because the lesions are seen in their natural size and position, and in their normal relations to surrounding structures, while with the mirror they are greatly foreshortened and distorted because they can only be seen at a high angle of reflection.

In children, where they obstinately object to laryngoscopic examination, it is practically impossible to get a view of their vocal cords. In such cases autoscopy, where it is applicable, will prove of great service. Examinations with the mirror during narcosis are usually surrounded by so many technical difficulties that the view obtained is not satisfactory, while with the direct method the technical difficulties disappear. It is clear, then, that the practice of autoscopy deserves a place in laryngology, and will undoubtedly have it.

As to general diagnosis, there are certain conditions of the heart-valves and of the aorta that give almost unmistakable signs in the larynx in certain cases; and where the patient is, so to say, autoscopable, then they are seen better by the direct method than with the mirror. Gerhardt described a pulsation of the tracheal wall that he noticed especially in cases where the Corrigan water-hammer pulse was present in insufficiency of the aortic valves. Schrötter has described a slight tremulous pulsation at the same point even in perfectly normal patients. Both of these symptoms I have had occasion to observe a number of times by the direct method, where the anatomical conditions were favorable, more satisfactorily than I have ever seen them with the laryngoscope.

There is another important addition to our diagnostic armamentarium in recent years for which autoscopy promises to be of considerable assistance. It is in the use of the œsophagoscope. This instrument, despite Mikulicz's brilliant work in its original introduction, in Billroth's clinic, in which he was so ably seconded by Leiter,

the Vienna instrument maker, and despite von Hacker's facilitation of the technique, also at Vienna, has never come into general use. For some people it was found that the introduction of a straight instrument was practically impossible, or at least such a source of torture to the patient that it could not be used.

Of late, Rosenheim, here in Berlin, has once more awakened interest in the œsophagoscope, and made it clear that it was much more widely applicable than was before thought. Since the introduction of autoscopy, I have found that facility in the use of the œsophagoscope depended to a great extent on the autoscopability of the patient; that the former was a function of the latter. If it is comparatively easy to make a direct examination of a patient's larynx, then it will always be a simple matter to pass an œsophagoscope, as it is exactly this angle made by the muscles of the base of the tongue in such a case that causes all the difficulty in the passage of a straight tube into the stomach.

Let me illustrate to you what I mean on this patient. He is eminently autoscopable; even those of you who have had no practice in autoscopy can get a good view of even the forward part of his vocal cords. It has usually been advised to pass an œsophagoscope with the patient lying down. Rosenheim has even advised a special position for which he has invented a special examining table, in which the patient's head hangs lower than his body. Here you see with what ease I am able to pass the œsophagoscope in the sitting position. Instead of making a series of more or less empirical attempts that are annoying to the patient and to the doctor, only perhaps to fail in œsophagoscopy in the end, because there are certain cases in which the use of the œsophagoscope is bound up with so much inconvenience to the patient that it is practically impossible, and yet there is no way of recognizing such cases from any external sign before actual trial, all I have to do is to decide by an autoscopic examination the anatomical relations of the parts with reference to the possibility of securing a straight path through mouth and pharynx for the œsophagoscope, and so be perfectly oriented as to the amount and character of the obstruction I am likely to meet with in the passage of the instrument. This advantage will, I think, make the œsophagoscope more popular, since it will make the problem of its applicability to a given case more easy of solution.

Dermatology.

LUPUS VULGARIS.[1]

CLINICAL LECTURE DELIVERED IN THE NEUE CHARITÉ, BERLIN.

BY PROFESSOR EDMUND LESSER,

Director of the Clinic for Skin and Venereal Diseases and Professor of Skin and Venereal Diseases at the University of Berlin, Germany.

GENTLEMEN,—We have during these last few days seen a number of cases of lupus, and I present another this morning, and shall take the occasion to sum up briefly our practical knowledge of this important skin diseases. The patient whose face I uncover is, as you see, in a most pitiable condition from the ravages of the disease. The whole face has been affected, and though there are scarcely any traces of fresh outbreaks of the disease, the scar tissue left behind by the old diseased processes continues in its contractile state the hideous work of facial deformity.

The point of the nose has disappeared and the alæ are eaten away so that scarcely any of the original form of the organ is left. The eyes have been destroyed, and only two masses of cicatricial tissue occupy their places in the orbits. Here, near the nose on each side, are two small openings, the remains of the tear-ducts. The lips are sadly contorted by cicatricial contraction, and the chronic inflammatory process, by interference with the lymphatics of the parts, has produced an elephantiac hypertrophy of both lips, most marked in the lower one. A condition that may be called eclabium, a protrusion of the lips with inability to close them, has resulted.

His mucous membranes have been also affected. His conjunctiva doubtless suffered with his eyes, and formed the initial ocular lesions. We can see the nodules of infiltration here on the inside of his lips, on his cheeks, on his gums, on his palate, on his tongue.

[1] Reported by J. J. Walsh, M.D., Ph.D.

Here on his neck there are some more recent lesions, and we find here and there discrete lupus nodules in the midst of healthy tissue.

There are no signs of the disease on the rest of his body. His general health has not suffered. In one of his lungs there is a suspiciously duller note on percussion and a roughness of the breath sounds, that may indicate tubercular infiltration at this point, but may not. So that though the disease began when he was very young, —about three, and he is now thirteen years old,—there has been no auto-inoculation, and the disease has remained absolutely localized, content with spreading from a single focus.

While I am still talking of his respiratory organs, let me call your attention to his nose. The cicatricial contraction of the connective tissue that has resulted from the chronic inflammatory process is so marked that sufficient room for breathing purposes would not be left if the contractile tendency was not checked, so he has to keep tubes in the nasal openings. There is in his case absolutely no family history of tuberculosis.

If anything were needed to impress upon you the importance of lupus and its treatment, it is a case like this where the mutilations produced are even worse than those that result from lepra or syphilis, though these latter are much more feared. Lupus, though its real cause has only been known for certain these last few years, has been the subject of a great deal of clinical study, and the clinical course of the disease and its special features have been well known. It is its clinical features that are still of most interest, for while it might be thought that the discovery of the bacillus tuberculosis in the affected tissues would be the surest way to diagnose the disease, the demonstration of the bacillus is often so difficult and tedious,—fifty microscopic sections of excised tissue being sometimes examined before the bacillus is found,—that the diagnosis depends as much as ever before upon the macroscopic appearances presented by the case.

Lupus begins in little nodules of a clear yellowish-brown color, seen distinctly beneath the skin, but at first causing no prominence. The recognition of these little nodules, really small tubercles, constitutes the pathognomonic feature of the disease. In our case of yesterday, you remember, where the location of the lesion just at the edge of the hairy scalp and some of its external appearances made the diagnosis doubtful, gentle pressure with a glass plate made the superficial hyperæmia disappear, and brought out clearly the characteristic

yellowish-brown nodules beneath the skin. These nodules are not hard, as in syphilitic affections, but are even softer in consistency than the normal tissues. If a pin be pushed through the skin it meets with less resistance than normal, and if the lesion is situated where the skin can be picked up between the fingers no induration is felt.

Before the lesions become prominent the condition is called lupus maculosus; later, when they project above the skin surface, it is called lupus tuberculosus. This name has no reference to the connection of the disease with tuberculosis, but was derived long ago from the word tuberculum, a little tumor. When the tumors become still larger, and confluent in masses, then we have the form lupus tumidus, or hypertrophicus. One of the advantages of studying a case as far advanced as this one here is that we can note lesions in all of these various stages on the same patient. Here in the recent lesions in the neck we have the macular and incipient tubercular form; here on the forehead and lips the tumid hypertrophic form. There is finally a warty verrucose or papillary form of the disease, which occurs especially on the extremities, and is due to papillary overgrowth.

Besides the division of lupus into forms, according to the size of the lesions, it may be divided according to its mode of evolution or involution. If it spreads, for instance, without order, in scattered spots, it is called lupus disseminatus; if the extension of infection always takes place from the periphery of existent lesions, the older parts healing as the disease advances, it is spoken of as lupus serpiginosus. If the affection runs a chronic course, healing by gradual disappearance of the nodules after a good deal of scaling, it is spoken of as exfoliative; if it is more acute, and breaks down, it is called lupus exulcerans. All of these forms may exist together on different parts of the same patient, though at times lesions of only one form or in but one stage may be found, when the diagnosis of the disease may be very difficult.

The ulcerative form of lupus may then simulate syphilis very closely, though, as a rule, the differentiation of the lesions of the two diseases is not so difficult. The syphilitic ulcer usually is deep, has abrupt edges, and is covered with an abundant purulent layer; the ulcerative lesion of lupus is usually not sunk below the surface, but is on a level or may even be raised above the surrounding tissues, the surface of the ulcer is often covered with crusts, and beneath the

crusts there is but a small amount of pus, on a reddish, moist, granular ground.

Lupus invades the mucous membrane also, and the lesions it produces are, as may be seen very well in our case for to-day, very different from those on the skin. The nodules that appear below the surface at first are not yellowish brown, but gray. They coalesce very soon, grow larger much more rapidly, and ulcerate sooner than the cutaneous lesions, and lead to the formation of rhagades, especially where skin and mucous membrane meet. Lupus has, as a rule, a very characteristic localization. It occurs oftenest on the face, and here distinctly favors the cheeks, the nose, and the upper lip. Next to the face in frequency of involvement in the disease are the hands and the throat, the exposed parts of the body, in a word. Other parts may be affected. Indeed, lupus of the arms and legs is not so uncommon, but the lesions are usually secondary to others that have occurred on the ordinarily affected parts.

The affections of the nose in lupus lead to great deformity. You have seen in this case how the whole natural contour of the nose may be destroyed. Usually, at first the presence of the nodules of lupus tissue on the nose make it larger than normal, but if ulceration sets in this seeming hypertrophy soon gives way to marked loss of tissue and decrease in size. Any attempt at therapy in such a case must lead to the destruction of these prominent nodules, so that in any case a nose materially lessened in size will result. It is well to warn patients and their friends at the beginning of the treatment that this loss of nasal tissue is bound to ensue, and thus forestall the complaints that will otherwise inevitably come that the organ looks worse after the treatment than before.

Where lupus attacks the eye, there results, when neglected, as in our case here, ulcerative perforation of the cornea, general infection of the eye, with consequent phthisis bulbi and cicatricial contraction of all the ocular tissues. Even where no perforation of the cornea takes place, as is usually the case, there may result from the chronic ulcerative process a cloudiness of the cornea that is permanent and effectually prevents proper vision.

It used to be thought that primary lupus of mucous membranes was very rare, but recent observations have led us to believe that it is not so infrequent. There is often a history of a chronic rhinitis, with an ulcerative process in the nose, that lasts for years perhaps,

and is not paid much attention to because it is not disfiguring and gives no serious symptoms; then come the lupus nodules as a clear bit of evidence of the nature of the process that has been at work inside the nose. Occasionally, too, other mucous membranes—the tonsils, the pharynx, the larynx, even the conjunctiva—are primarily attacked.

We have spoken always of lupus of the skin; you must remember, however, that it has a distinct tendency in many cases to invade the deeper soft tissues. It does not often attack bone, which constitutes a very characteristic pathognomonic distinction from syphilis, with its well-known tendency to set up bony necrosis. The difference between the characteristic deformities produced in the nose by the two diseases is very striking. The undermining of the bony substructure of the base of the nose causes a falling in of the bridge of the nose, with the production of what has been aptly called "the saddle nose." This may occur in syphilis without the slightest cutaneous lesion appearing, and after the process is over there is not an external sign of it except the deformity. In lupus the contraction of the scar tissue gives rise, besides the loss of nasal substance, to an appearance as if the nose were pulled back forcibly by "reins," a very flat nose resulting, as if the nose were being pressed back forcibly upon the face continuously. This appearance is to be seen well in our case here, though the nose has lost so much substance that its practical absence is the most striking thing about it.

The deeper invasion of tissues occurs especially in the extremities. The tendons and tendon sheaths in the hand, for instance, may suffer a great deal, and considerable deformity and loss of usefulness result. Here, too, bone-lesions are not so uncommon. The phalanx next to the metacarpals in the hand is attacked, and the bone even may be exfoliated. The consequent contraction of the tissues gives rise to peculiarly dwarfed fingers, much shorter than normal, with one, perhaps two phalanges missing, but usually with the ungual phalanx, especially the nail itself and its immediate neighborhood, unaffected. This form of deformity is not met with so frequently now, as the energetic treatment of lupus prevents its development.

The same process may invade the toes also, and runs practically the same course as in the fingers, the premetacarpal phalanx being particularly attacked. Here the disease is more apt to be utterly neglected, because it is not exposed to view, runs an extremely chronic

course, and does not give rise to many symptoms. The large toe is usually spared, but the other toes may be dwarfed, contorted, and involved together in a mass of cicatricial tissue, that makes them individually unrecognizable. This process often gives rise to the so-called elephant's foot appearance, the short, broad, stunted toe appearance.

The disease usually begins in childhood, children being seemingly less resistant to the bacillary invasion, but it may begin at almost any period in life, the liability, however, becoming less with advancing years. It runs an extremely chronic course; it may be years before the primary lesions advance enough to become seriously deforming. On the other hand, lesions that seem healed for a long time and have cicatrized completely may relapse. This extreme chronicity and the marked tendency to relapses are very characteristic of the disease.

It used to be said that the general health of patients affected by lupus did not suffer, and that its presence was compatible with long life. This we now know not to be absolutely true. Patients with lupus are prone to a generalization of the disease, and the prognosis *quod vitam* is not near so good in lupus as we formerly believed. Every lupus patient is continually carrying around with him a focus of tubercular infection, and the careful observation of recent years shows that such patients die much more frequently from lung or intestinal, or even acute miliary, tuberculosis than used to be thought.

The main difficulty of diagnosis in lupus is the differentiation of its lesions from those of tertiary syphilis. The main differential points I have already given. To summarize them, there is first the chronicity of lupus. Syphilis runs a chronic course, but it is rapid compared to lupus. If the history shows that serious ulceration with loss of tissue has taken place within a year or two, then syphilis, not lupus, is at work. Second, relapses; where there is a history of cicatrization and subsequent recurrence, it is, as a rule, lupus, not syphilis. Third, the character of the ulceration; deep, with punched-out edges and abundant purulent secretion in syphilis; superficial, even raised above the surface, in lupus, and with but little tendency to formation of pus. Finally, there is the tendency of syphilis to invade bone, which is absent in lupus.

Despite characteristic differences in ordinary cases, there are

lesions of lupus and syphilis that at times bear striking resemblances to each other. I show you, for example, here a picture from Hebra's atlas of skin diseases, where the lesions of lupus occur only on the thigh, an unusual location, where, while the disease is spreading peripherally, the centre of the lesion is healed, and where the ulcers look deep are associated with considerable loss of tissue, and seem to be covered abundantly with pus. That there is no possibility of mistake as to diagnosis is clear, since, surely, "old" Hebra knew his lupus and syphilis well. It is in such cases especially that the diagnosis *ex adjuvantibus* may come to your aid. Doubtful lesions that begin to heal immediately under the administration of potassium iodide are of course syphilitic, and this "therapeutic test" may be of the greatest service. Whenever, then, you have the slightest doubt,—and the more experience you have the less will you trust your diagnostic acumen,—try antisyphilitic treatment. It is much better to err and treat genuine lupus for a while as if it were syphilis, than to permit syphilitic lesions to make irreparable inroads into the tissues while it is being taken for lupus.

I have said before that the finding of the bacillus microscopically is too tedious and uncertain to be of practical value in diagnosis. The inoculation of animals with portions of the excised tissues is surer and may be of service. You must wait three to six weeks for the results of inoculation, however, and not every practitioner is in a position to keep animals under observation for this length of time. The question of heredity or of finding other signs of tubercular processes in the body is of very slight diagnostic value. Cases occur in which there has never been any tuberculosis in the family, and lupus may run its course for years without other organs being affected.

Since Koch's discovery of the tubercle bacillus and Demme's (of Berne) demonstration of it in the lesions of lupus, we know that the affection is really a tuberculosis of the skin, but long before we had this proof of the nature of the disease, the pathological anatomy of the primary lupus nodules had led us to suspect as much. Friedländer called them tubercles of the skin, and at first they have all the characteristics of such lesions. There is a frame-work of connective tissue in the midst of which round and epithelioid cells are to be found, and after the lesions have grown older also giant cells. Spread of the infection takes place along the blood-vessels, and so the circulation is interfered with and softening takes place. When

the lesions have grown very old there is often an epithelial overgrowth from chronic irritation that gives the appearance of epithelioma, a fact that is not to be forgotten in examining sections of excised lupus tissue. On the other hand, it must be borne in mind that epithelioma sometimes develops from an old lupus scar, so that a sudden tendency to rapid growth with invasion of surrounding tissues is suspicious.

As to how the tuberculous infection takes place—*i.e.*, whether through the circulation or by direct local inoculation—was for a long time a subject of dispute. Recently, however, observations have shown that local inoculation is the usual origin. A very strikingly conclusive case for this opinion is the one reported some years ago in which a young man engaged to be married and affected with consumption tattooed his *fiancée's* arm, wetting the needle used for the purpose by putting it into his mouth. He himself died before the marriage took place, and the *fiancée* developed lupus in the tattoo marks. Another equally demonstrative case is that of a medical student wounded a number of times on the scalp in a students' duel; he was engaged a good deal in examining sputum, and used often to scratch his head while the scalp wounds were healing, because of the itchiness that so often occurs during cicatrization. Though lupus is rare on the hairy scalp, it developed in the scars of the wounds in his case. There is the case of a butcher cutting himself with a knife that had been used in butchering tuberculous cattle, and developing lupus in the cuts. Varicella lesions have been known to be the site of the lupus inoculation. Washerwomen who have to wash the clothes of consumptives are known to be especially liable to lupus of the hands. Then the fact that the disease occurs most frequently on exposed parts, that the nose is so often affected, while we know that the air we breathe nearly always contains tubercle bacilli, and finally its occurrence on those who live with tuberculous patients; all this furnishes complete and convincing evidence that infection takes place by local inoculation.

To the old-time doctors the treatment of lupus was practically hopeless. It was sometimes called *noli me tangere*—"touch me not." We have learned, however, that we can do a great deal for it. We can absolutely cure recent definitely limited lesions; we can greatly improve inveterate and extensive ones. As the process is due to the tubercle bacillus, the only hope of radical cure is by the ex-

tirpation of the diseased area. In recent cases this is often easy; in older cases the wide extension of the invaded area may make us hesitate; especially on the face are we deterred from wide removal of diseased tissue. Thiersch's method of skin transplantation has, however, been of great assistance to us here. After the removal of the affected area we can cover up the tissue defect by skin grafts, and the healing is very satisfactory. I have here a patient in whom an area as large as a silver dollar was removed from the cheek and the spot covered by a skin flap taken from his thigh. You see how well the grafts have taken. Our little man here (he is but seven) has a heterochronic hypertrichosis on this cheek now, due to the existence of hair on the part of the thigh from which the flap came, but it will not be long, let us hope, before the growth of beard on the other cheek will restore symmetry once more. The spot remains redder than the surrounding tissues, and there is usually a difference in level between this part and the surrounding tissues, so that the cosmetic result is nothing to be proud of, as a rule. Differences of level may be avoided and a better cosmetic result obtained by using flaps of the whole thickness of the skin, which are either transferred to the part from which the lupus has been extirpated while still attached by a pedicle to some of the tissues, or are moved without a pedicle. It is wonderful how well the skin preserves its vitality when so removed, and, though a complicated structure of nerves and blood-vessels and various tissue layers, adapts itself to its new location. Where the extirpation has been thorough there are no relapses in such cases, so that while there is some scarring and deformity, the patient is well rid of a focus of infection, always liable to spread, and carrying with it a certain danger of general infection, so that he may be well satisfied.

Extirpation is not always possible, either because of the position or extent of the lesions or the unwillingness of the patient, so that other methods must be known. All modes of treatment involve destruction of the affected area, and this may be accomplished by (*a*) chemic, (*b*) thermic, (*c*) mechanical means. One of the best caustics is undoubtedly arsenous acid. I use it in the following formula:

℞ Acidi arsenicosi, gramme 1 (gr. xv);
Cinnabar factit., grammes 3 (gr. xlv);
Vaselini, grammes 12 (℥iii);
Lanolini, grammes 3 (gr. xlv).

The second ingredient is only a coloring matter that gives an intense red color, and so keeps the salve from being used for any other purpose by mistake. I spread the salve to the thickness of a millimetre—*i.e.*, to about the thickness of the back of a knife-blade—on a piece of linen cut to the size of the lesion. I allow the plaster so made to remain on for twenty-four hours; then remove it and wash the spot; I apply a similar plaster for the second twenty-four hours; I then wash once more and reapply the plaster as before. During the second day the application is painful; on the third day morphine will usually have to be given for the pain, it is so severe. But by the end of the third day the affected tissue has all been destroyed, and the wonderful eclectic action of the arsenic is evident, for the healthy tissue is not affected. There is some danger, but it is very slight, of fatal poisoning where much of the salve is applied at once. Where the lupus areas are large a portion should be covered at a time, but a patch a couple of inches square may be thus treated with perfect security.

After arsenic the best caustic is pyrogallol. This cannot be applied with such absolute assurance as to when the results will have been secured. A ten-per-cent. salve of pyrogallol applied each day for from five to six days will usually suffice. With arsenous acid the lupus nodules become gray from degenerative changes under the influence of the drug; with pyrogallol all the tissues are oxidized to black, so that it is not so easy to be sure when the desired effect has been produced.

There remains one other caustic to mention: it is argenti nitras, an especially hard preparation, that is put on the market in sticks. These are sharpened at the end and then bored into disseminated lesions of lupus, especially such as occur as relapses after operation, and the diseased tissue is destroyed partly mechanically, partly chemically. Heat may be employed,—the hot iron, the paquelin cautery, etc.,—but all tissue that is touched is destroyed, the affected and the unaffected at the same time. There is no selective action, and the scarring is often serious, so that it is not much used. Gerhardt's suggestion of employing cold—ice-bags being put over the lesions, the lowered temperature preventing the normal growth of the bacteria and eventually killing them, the bacilli being very sensitive to low temperatures—deserves mention as pretty in theory, but it has not met with much success in practice.

There remains the mechanical means, which consists in the scraping out of the tissues with a Volkman's sharp spoon, or curette. I may say that Volkman's method by means of multiple incisions has been given up. The curetting should be done with all the force you can employ, as anything less than forcible curettage is worse than useless; it is needless torment of the patient. Curetting always leaves a certain amount of chance for absorption of tubercle bacilli by the lymphatic vessels, and miliary tuberculosis has occurred in a few reported cases after it. It is well to shut up the absorbents in the tissues at once, and for this purpose cauterize them immediately with a fifty-per-cent. solution of nitrate of silver. Of course, anything short of complete extirpation does not give a sure cure, and a lupus patient must be kept under observation, so as to forestall the spread of the first lesions that come in a relapse. Immediate treatment of small nodular recurrences will save trouble and deformity.

Of late the Röntgen rays have been sometimes used in the treatment of lupus. They often produce an acute dermatitis that is followed by cicatrization. It is extremely hard to regulate the amount of dermatitis that will be produced in such cases; any effect at all is not sure, and too little or too much is nearly always done, so that the method is not practical. Of late in Norway Finsen has reported some good results from the use of rays of blue light,—*i.e.*, light from which the red and yellow rays have been excluded. Bacilli are known to be affected in their growth especially by certain light rays, so that such a mode of treatment is not impossible, but it needs substantiation.

As internal remedies the strengthening effect of cod-liver oil and iron do good, but only as an auxiliary to local treatment. Arsenic may, however, be recommended as of special service. It does not act upon the microbes, but seems to tone cellular activity for the battle with infection. It really often gives surprisingly good results.

Koch's tuberculin, neither the old nor the new, has fulfilled the hopes that were raised by the results seemingly obtained at first. It is just possible that tuberculin (the difference between the new and the old in practice does not seem to amount to much) is of some value in the treatment of lupus of mucous membranes, and as such may retain a place in therapeutics.

Despite our failure so far to find an internal specific remedy for the disease, the analogy between the lesions of lupus and of syphilis

is so great that we are tempted to think that an internal remedy will yet be found which will act as favorably upon lupus as the mercurial preparations do in syphilis. The treatment of the future for lupus will be to my mind a much more successful one than at present, but it will be due to the discovery of some such substance as I have mentioned.

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